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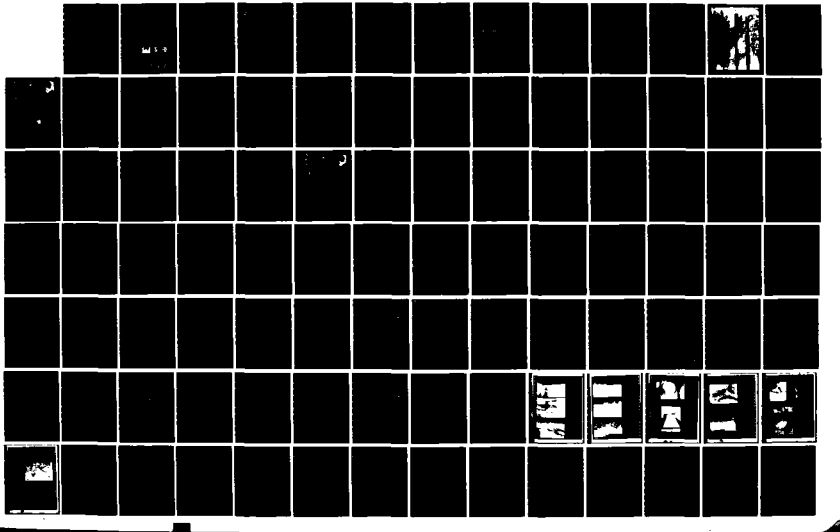

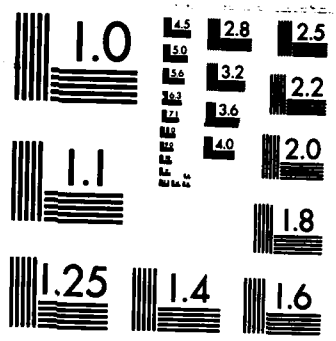

HOUSATONIC RIVER BASIN
WASHINGTON, MASSACHUSETTS

WASHINGTON MOUNTAIN LAKE DAM
MA 00318

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

DECEMBER 1979

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Housatonic River Basin
Washington, Massachusetts
Washington Mountain Brook (Tributary of the Housatonic River)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam is an earth embankment 1145 ft. long and 44 ft. high at the downstream toe with a drop inlet service spillway structure and a 30 inch outlet conduit. The size of the dam is intermediate and the hazard potential is high. The dam was found to be in fair condition. The drainage area of the dam is 1.3 square miles and is made up primarily of rolling hill woodland.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF
NEDED

AUG 0 6 1980

Honorable Edward J. King
Governor of the Commonwealth of
Massachusetts
State House
Boston, Massachusetts 02133

Dear Governor King:

Inclosed is a copy of the Washington Mountain Lake Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Quality Engineering, the cooperating agency for the Commonwealth of Massachusetts. In addition, a copy of the report has also been furnished the owner, Commonwealth of Massachusetts, Division of Forests & Parks, 100 Cambridge Street, Boston, Massachusetts 02202.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Quality Engineering for your cooperation in carrying out this program.

Sincerely,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

WASHINGTON MOUNTAIN LAKE DAM

MA 00318

HOUSATONIC RIVER BASIN

WASHINGTON, MASSACHUSETTS

PHASE I INSPECTION REPORT
NATONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I REPORT

Identification No.:	MA 00318
Mass. DPW No.:	1-2-313-11
Name of Dam:	Washington Mountain Lake Dam
Town:	Washington
County and State:	Berkshire County, Massachusetts
Stream:	Washington Mountain Brook (Tributary of the Housatonic River)
Date of Inspection:	November 2, 1979

BRIEF ASSESSMENT

The Washington Mountain Lake Dam is located in the watershed of Washington Mountain Brook, a tributary of the Housatonic River, approximately 3 miles upstream of the confluence of Washington Mountain Brook with the Housatonic River in Lee, Massachusetts. The dam is an earth embankment 1145 feet long and 44 feet high at the downstream toe with a drop inlet service spillway structure and a 30-inch outlet conduit. An emergency spillway 50 feet wide is cut into the right abutment. A dike consisting of an earth embankment impounds water to form the lake in conjunction with the dam. The dike is located approximately 3500 feet east of the dam. The dike is the subject of a separate report.

The dam is owned by the Commonwealth of Massachusetts, Division of Forests and Parks. It was designed by the Soil Conservation Service for the purpose of flood protection and recreation in the October Mountain State Forest.

The drainage area of the dam is 1.3 square miles and is made up primarily of rolling hill woodland. The dam impounds 3225 acre-feet at low stage but has a maximum impoundment of 4575 acre-feet at top of dam. The dam is INTERMEDIATE in size and its hazard classification is HIGH since significant property damage and loss of life could result in the event of a dam failure.

The dam has not impounded a normal pool of water to date due to the existence of an underground telephone cable in the pool area which is scheduled to be relocated in the near future. Some flood runoff is impounded periodically but eventually released through the pond drain sluice gate, which to date has been left open.

The test flood for this dam is the Probable Maximum Flood (PMF). The peak inflow for this flood is 3,000 cfs. Because of storage and the spillway capacity the runoff volume will be contained in the reservoir. The peak discharge will be about 600 cfs and the reservoir stage will be at elevation 1,803 feet (MSL).

The dam and appurtenances were found to be in FAIR condition. Remedial measures to be undertaken by the owner include: investigate source of silt and gravel in foundation drains, repair broken foundation drain pipe outlets, repair tire ruts on the top of the dam, fill emergency spillway at the top of the left slope to top of dam elevation,

repair concrete at the impact basin, repair the gate operator and base, prevent trespassing on slopes, clean debris from the downstream flow conduit, investigate the change in slope of the pond drain pipe, operate the drain gate as an annual inspection program and develop a formal written emergency flood warning system.

The remedial measures outlined above should be implemented within one year of receipt of this report by the owner. The program of annual technical inspections should be continued.

John W. Powers
Massachusetts Registration 23106

This Phase I Inspection Report on Washington Mountain Lake Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

RICHARD DIBUONO, MEMBER
Water Control Branch
Engineering Division

ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

CARNEY M. TERZIAN, CHAIRMAN
Design Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation: however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition, and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-treapassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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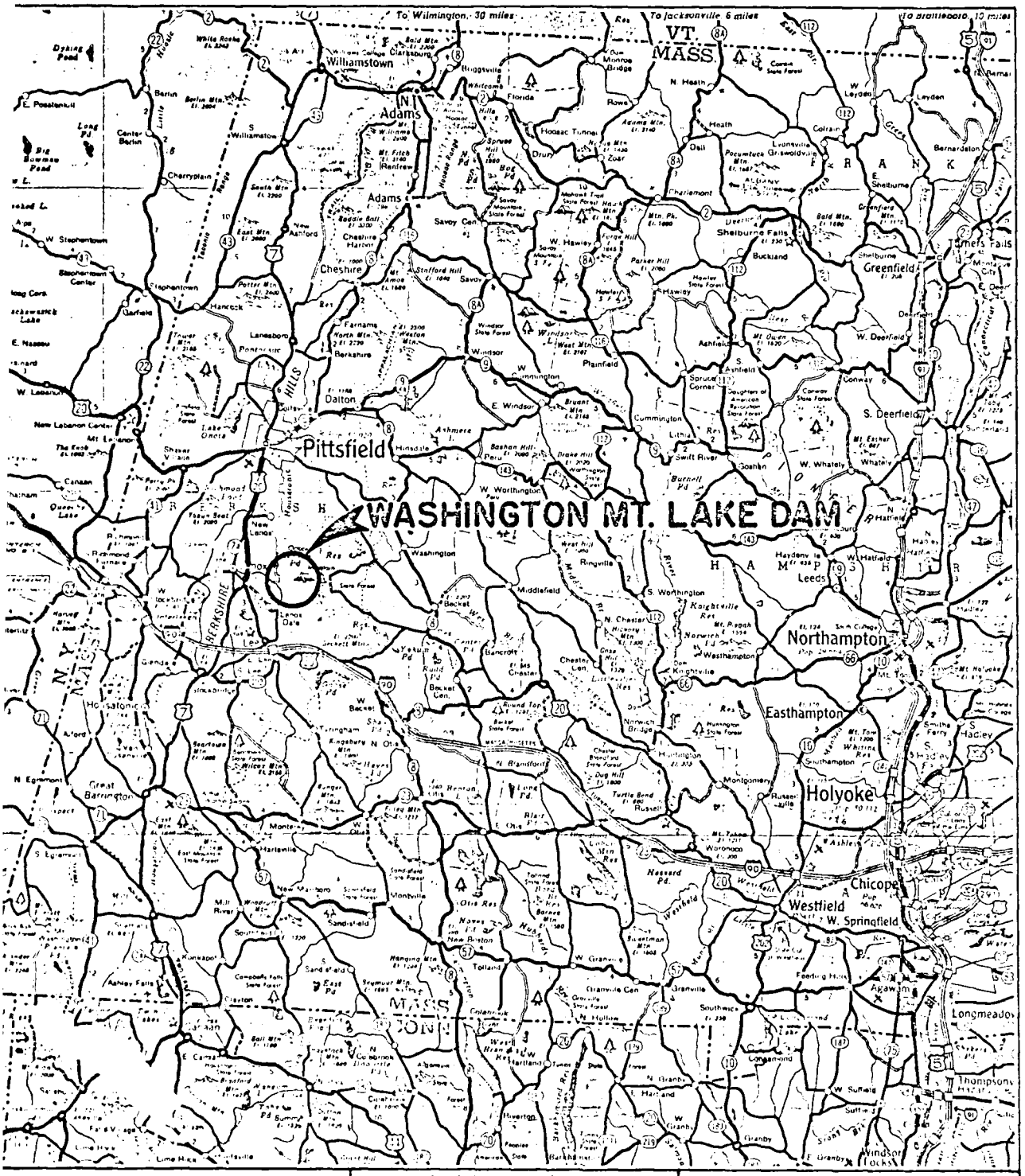

TIGHE & BOND / SCI CONSULTING ENGINEERS EASTHAMPTON, MASS.	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

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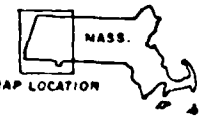
SCALE IN MILES



MAP LOCATION

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

LOCUS PLAN 1

WASHINGTON MOUNTAIN LAKE DAM (MA 318)
BERKSHIRE COUNTY MASSACHUSETTS

			SCALE: AS NOTED
			DATE: DECEMBER 1979

3) Silt in the left foundation drain pipe at the impact basin; misalignment also noted.

4) Broken pipe and misalignment of the right foundation drain at the impact basin.

5) Vehicular traffic on slopes of the emergency spillway.

6) The top of the dam at the spillway (right) end of the dam is lower than the design finish grade.

7) Debris in downstream flow conduit.

8) The apparent change in slope of the 20" pond drain pipe.

9) The damaged shaft on the pond drain operator and damaged concrete base. Also, missing nuts at the base of the operator.

10) Damaged concrete around the outlet pipe.

11) The guide berm at the left side of the emergency spillway discharge channel requires protection to prevent erosion.

(c) Appurtenant Structures

1) Inlet Structure At Pond Drain. (See Photos #6 & 7)

The inlet structure at the pond drain is in good condition. Some debris is caught on the trash rack.

The bottom release outlet pipe above the pond drain has a considerable amount of debris in it placed there by vandals. Also, the concrete repair around the pipe at the structure is rough and minor spalling is occurring.

The 20" pond drain pipe appears to be flat for about three pipelengths before it slopes to the riser.

2) Riser Structure and Normal Spillway (See Photo #2 & 8)

The riser structure and normal spillway is in good condition. Some areas of the concrete work are chipped from vandals. The grate covering the high stage weir opening has been damaged from vandals.

The crank shaft on the pond drain gate operator shows signs of damage due to use of a tool other than the proper crank to operate the gate. Also, two nuts are missing at the operator base and the concrete base is cracked.

3) Outlet Structure (See Photo #9)

The outlet structure is in generally good condition. Concrete has broken away from the structure completely around the end of the 30" conduit.

(d) Reservoir Area (See Photo #4)

The shore of the reservoir is shallow sloping and is stable.

(e) Downstream Channel

The downstream channel is a narrow channel passing over a shallow sloping area. The channel is stable and the area around the impact basin is in good condition.

3.2 Evaluation

The dam is in generally FAIR condition at this time. The foundation drain system is in POOR condition. The potential problems noted during the visual inspection are listed below:

1) Tire ruts on the top of dam are causing puddles and erosion.

2) Gravel in the foundation drain pipe located 365 feet left of the impact basin.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

(a) General

The Washington Mountain Lake Dam was in FAIR condition at the time of the inspection.

(b) Dam

1) Earth Embankment (see photo #1, 10, 11 and 12)

The top of the dam has been traveled upon by vehicles and wheel ruts have developed. The ruts contain rainwater and continuous use as a road has caused erosion.

The foundation drain outlet which is about 365 feet to the left of the impact basin is a 4" AC pipe and is about 1/3 full of gravel that appears to have its source from within the pipe.

The foundation drains at the impact basin both show signs of damage.

The left drain pipe at the impact basin contains silt to about 1/4 the diameter which could have its source upstream in the foundation drain system. This drain pipe is also misaligned.

The right drain pipe is broken about 18" to 20" in from the end with a misalignment and gap between the broken sections. A smaller diameter plastic pipe has been inserted inside the AC pipe. The right drain did not show any flow even though the area above the impact basin, below the emergency spillway and adjacent to the toe of the dam was very wet. This drain could be plugged. The wet area appears to be ground water since there is no water impounded behind the dam.

2) Emergency Spillway (See Photo #3)

The emergency spillway is in good condition. Some vehicular traffic on the slope of the spillway has caused ruts. The top of the dam at the spillway (right) end of the dam is 1.2 feet lower than the design finish grade. It appears that this portion of the dam was originally constructed to this lower elevation. The guide berm bordering the left downstream side of the spillway is not protected against erosion is not adequate along the berm and erosion will result when the spillway is functioning.

SECTION 2 - ENGINEERING DATA

2.1 Design Data

Design data available from the Soil Conservation Service included hydrologic and hydraulic computations, structural computations, a geological report, soil laboratory test results, and embankment slope stability analysis computations. This data was reviewed and found to be substantially correct and valid. Therefore, it was used extensively in the computations presented in Section 5 and Appendix D of this report.

2.2 Construction Data

"As built" plans are available for this dam and show good agreement with the design plans and the visual inspection. Records show the top of dam and dike elevations to be the same (1,804.0 MSL). Because of the remoteness of the structures from each other, the elevations of the top were not verified in the field.

2.3 Operational Data

No operational data is available as the dam is self regulating and as of this date does not impound a normal pool of water.

2.4 Evaluation of Data

(a) Availability

Sufficient data is available to permit an evaluation of the dam when combined with findings of the visual inspection.

(b) Adequacy

There is sufficient design and construction data to permit an assessment of dam safety when combined with the visual inspection, past performance, and sound engineering judgment.

(c) Validity

Since the observations of the inspection team generally confirm the available data, a satisfactory evaluation for validity is indicated.

b) Low stage inlet: 30.8 ft.

c) High stage inlet: 15 ft.

d) Emergency spillway: 50 ft.

3) Crest Elevation (ft. above MSL)

a) Pond drain inlet: 1771.0

b) Low stage inlet: 1797.98

c) High stage inlet: 1801.0

d) Emergency spillway: 1801.0

4) Gates: 20 inch vertical lift sluice gate on pond drain inlet

5) Upstream channel: Reservoir

6) Downstream channel: Narrow channel through gently sloping flood plain

(j) Regulating Outlet

The only regulating outlet is a 20 inch diameter reservoir drain pipe controlled by a crank operated sluice gate. The pipe invert is at elevation 1771.0 (MSL) at the drain inlet structure. The purpose of this outlet is pond drainage and it will be normally closed once a telephone cable in the pond area is relocated.

The gate is a Rodney Hunt, rising stem type, having the following identification:

28686-2
S-5002-A

3) Spillway crest pool:

a) Low stage inlet: 224

b) High stage inlet: 243

c) Emergency spillway: 243

4) Test flood: Less than 256

5) Top of dam: 262

(g) Dam

1) Type: Earth embankment with riprap slope surface protection and earth cutoff trench

2) Length: 1145 ft.

3) Height: 34 ft.

4) Top width: 20 ft.

5) Side slopes: Upstream: 3 to 1
Downstream: 2.5 to 1

6) Zoning: *Homogeneous sand, silty with gravel and boulders,* Foundation drain of drain fill.

7) Impervious core: None

8) Cutoff: Variable width, earthfill

9) Grout curtain: None

(h) Diversion and Regulating Tunnel

Not applicable

(i) Spillways

1) Type:

a) Principal spillway: Reinforced concrete drop inlet

b) Emergency spillway: Grass covered earth channel cut around the dam at the right abutment

2) Length of weir:

a) Pond drain inlet: 20 inch diameter pipe

6) Spillway crest:

a) Pond drain inlet: 1771.0

b) Low stage inlet: 1797.98

c) High stage inlet: 1801.0

d) Emergency spillway: 1801.0

7) Design surcharge: 1803.1

8) Top of dam: 1804.0

9) Test flood surcharge: 1,803.0

(d) Reservoir

1) Length of normal pool: 4,000± ft.

2) Length of flood control pool: 4,400± ft.

3) Length of emergency spillway crest pool: 4,400± ft.

4) Length of pool top of dam: 4,500± ft.

5) Length of test flood pool: 4,500±

(e) Storage (acre feet)

1) Normal pool: 3225

2) Flood control pool: 3910

3) Spillway crest pool:

a) Low stage inlet: 3225

b) High stage inlet: 3910

c) Emergency spillway: 3910

4) Top of dam: 4575

5) Test flood pool: 4325

(f) Reservoir Surface (acres)

1) Normal pool: 224

2) Flood control pool: 243

2) Maximum Known Flood

There is no data available for the maximum known flood at this damsite. Signs of debris on the embankment indicate that the water surface has been as high as at elevation 1793.0 (MSL).

3) Ungated Spillway Capacity at Top of Dam

The capacity of the principal spillway with the reservoir at top of dam elevation (1804 feet MSL) is 137.8 cfs. The capacity of the emergency spillway is 650 cfs at this level. The total capacity is, therefore, 788 cfs.

4) Ungated Spillway Capacity at Test Flood

The capacity of the principal spillway and the emergency spillway is not exceeded by the test flood and the dam is not overtopped. The discharge through the principal and emergency spillways at the test flood is about 600 cfs at an elevation of less than 1,803.

5) Gated Spillway Capacity at Normal Pool

There are no gated spillways with the exception of the gated pond drain inlet which would normally be closed when the dam impounds water.

6) Gated Spillway Capacity at Test Flood

As previously mentioned, there are no gated spillways.

7) Total Spillway Capacity at Test Flood

The total spillway capacity at test flood elevation is not exceeded and the dam is not overtopped. The total spillway discharge at test flood is about 600 cfs at an elevation of less than 1,803. The dam is safe from overtopping.

(c) Elevation (feet above MSL, NGVD)

1) Streambed at downstream toe of dam: 1760±

2) Bottom of cutoff: 1,762±

3) Maximum tailwater: unknown

4) Recreaton pool: 1798±

5) Full flood control pool: 1801±

Commonwealth of Massachusetts
Division of Forests and Parks
Pittsfield State Forest
Cascade Street
Pittsfield, Massachusetts

Mr. Douglas G. Poland is the Regional Supervisor. The telephone number is 1-413-442-8992.

(g) Purpose of the Dam

The Washington Mountain Lake Dam is a multiple-purpose dam which maintains a low level recreation pool and provides flood water storage to reduce downstream flooding from the dam's drainage area. Stored flood water is gradually released through low and high level inlets of the principal spillway.

(h) Design and Construction History

The Washington Mountain Lake Dam was designed by the U.S. Department of Agriculture, Soil Conservation Service. The dam was built under the Watershed Protection and Flood Prevention Act by the Massachusetts Department of Natural Resources, which is currently the Department of Environmental Management, the Massachusetts Water Resources Commission, the Berkshire Conservation District and the Town of Lee, Mass.

(i) Normal Operating Procedure

The Washington Mountain Lake Dam is normally self regulating. The pond drain gate is operated only as part of infrequent maintenance checks. At the time of this inspection, the gate was open to preclude impoundment of water.

1.3 Pertinent Data

(a) Drainage Area

The drainage area for this dam covers approximately 1.3 square miles. It is made up primarily of rolling hill woodland.

(b) Discharge at Damsite

1) Outlet Works

Normal discharge at the site is through the 30 inch diameter outlet pipe. In the event of severe flooding, water would flow over the emergency spillway and the high stage orifice at elevation 1801.0 feet (MSL). The invert of the low stage weir is at elevation 1797.98 feet (MSL). The invert of the high stage weir is at elevation 1801.0 feet (MSL), which is equivalent to the emergency spillway elevation.

and end sill are provided to dissipate energy. Wing walls, opening to the brook channel, project from the end of the basin at a 45° angle and are 9.33 feet long.

3) Emergency Spillway (See Pg. B-15)

The emergency spillway was excavated in the right abutment. It curves to the left around the embankment and is 50 feet wide at the control section which was excavated in natural ground. It is approximately 500 feet long and lies approximately 3 feet below the crest of the dam. The side slopes are 2 horizontal to 1 vertical.

4) Foundation Drainage (See Pg. B-17)

A six foot wide foundation drain of fine drain fill extends the full length of the dam from 6 feet below the crest at the centerline on a 1.5 horizontal to 1 vertical to the original ground downstream. A 4" AC pipe bedded in coarse drain fill is provided at the toe of the drain to collect water and outlets at two locations, one through each sidewall of the reinforced concrete impact basin. A third drain outlets about 365 feet to the left of the impact basin centerline.

(c) Size Classification

The dam's maximum impoundment (computed to the top of the dam) of 4575 acre feet and height of 44 feet place it in the INTERMEDIATE size category according to the Corps of Engineers' Recommended Guidelines.

(d) Hazard Classification

The hazard potential classification for this dam is HIGH because of the significant economic losses and potential for loss of life downstream which may occur in the event of dam failure. There is a high potential for severaly damaging about 17 homes with possible loss of more than a few lives, as well as four roadway bridges and one railroad bridge.

(e) Ownership

The Washington Mountain Lake Dam is owned by the Commonwealth of Massachusetts, Division of Forests and Parks, 100 Cambridge Street, Boston, Massachusetts. They can be reached by telephone at 617-727-3180.

(f) Operator

The operation of the Washington Mountain Lake Dam is controlled by the Commonwealth of Massachusetts, Division of Forests and Parks. The regional office responsible for the dam is as follows:

the base, 15 inches from 3.5 feet to 11.6 feet, 12 inches from 11.5 feet to 21.5 feet and 10 inches for the remainder of height.

Eight feet above the base of the structure is a 20 inch diameter, vertical lift, sluice gate inlet which is controlled by a crank operated bench stand with a rising stem. A 20 inch diameter, reinforced concrete pond drain pipe extends 64 feet upstream from the lift gate into the impoundment pool area. A reinforced concrete inlet structure at the upstream end of this pipe is protected by a trash rack of galvanized steel angle bars placed on an incline across the opening.

The "low stage inlet" is an uncontrolled weir box approximately 35.6 feet above the 30" pipe invert. It is 30.8 feet long around three sides of the riser. The box is about 4 feet deep and 2.5 feet wide. The water flows over the riser weir box and flows through four orifices into the riser structure. It is protected by a trash rack assembly sloping from the weir box to the top of the riser. This assembly is fabricated from galvanized steel angle sections.

The "high stage inlet" consists of an opening at the top of the riser 2.5 feet by 7.5 feet. The opening is protected by a galvanized steel grating 4 feet by 8 feet.

The dam is provided with a 12" diameter bottom release outlet pipe extending from the inlet structure to the weir box. The purpose of this pipe is to provide downstream flow in the brook when the pool level is below the permanent pool weir. At the time of the inspection the bottom release outlet was set to operate when the lake was at normal pool elevation. The release outlet will be modified, according to Soil Conservation Service officials, to operate when the pool level is below the normal spillway crest. When this modification is completed, water from the lake bottom will be discharged to the brook downstream of the dam by way of the riser and conduit.

The riser structure is drained by a 30 inch diameter reinforced concrete pressure pipe. It is approximately 134.3 feet long and drops approximately 2.50 feet over that length. The pipe penetrates the downstream side of the riser structure and is supported by an 8-inch thick concrete cradle within the embankment. Plans indicate 4 concrete anti-seep collars cast around the pipe within the embankment.

The downstream end of the conduit and cradle extends into a reinforced concrete impact basin. The impact basin is 8 feet long along the axis of the dam, 11.5 feet wide normal to the axis of the dam and about 6.5 feet deep as measured from the top of the wall at the 30" pipe. The basin is 1.33 feet to the bottom below the 30" pipe invert. A baffle wall

State Rt. 20 to Becket Road, Becket Road to Tyne Road, Tyne Road to Yokum Pond Road, Yokum Pond Road to County Road, County Road to Lenox-Whitney Place Road and Lenox-Whitney Place Road to West Branch Road. The dam is shown on USGS East Lee, Massachusetts quadrangle at approximately coordinates N-42°-21.3', W-73°-12.1'. (See location map on page v). Sheets B-13 and B-14 of Appendix B is a site plan for this dam.

(b) Description of Dam and Appurtenances

The dam consists of an earth embankment with an earthfill cutoff trench below the embankment, a principal spillway with a reinforced concrete riser and outlet pipe, and an emergency spillway located at the right abutment. The length of the embankment is 1145 feet. The emergency spillway is 50 feet wide at the control section. An earth embankment dike, located approximately 3500 feet east of the dam, impounds water in conjunction with the dam. From available records, the elevation of top of the dike is the same as the top of the dam. The dike is the subject of a separate report (Washington Mountain Lake Dike, MA 00319).

1) Embankment (See pgs. B-15, B-16 and B-17)

The following information has been taken from the As-Built Drawings dated 1974.

The embankment is made up primarily of sand, silty with gravel and boulders with a maximum stone size of 6" in Zone 1 and 12" in Zone 2. It is 1145 feet long and is a maximum of 44 feet high. The upstream slope is 3 horizontal to 1 vertical; the downstream slope is 2.5 horizontal to 1 vertical; and the width of the crest is 20 feet.

Beneath the embankment is an earthfill cutoff trench of variable width at the bottom. According to available plans, it is constructed of the same material as Zone 1 of the embankment. The cutoff trench was designed and constructed to extend through disturbed top soil to glacial till.

2) Principal Spillway (See pgs. B-9, B-19, B-20, B-21 and B-22)

The principal spillway consists of a reinforced concrete drop inlet structure with a sluice gate controlled pond drain pipe, two permanent pool uncontrolled crest weirs and orifice inlets, two uncontrolled high stage weirs and an outlet pipe supported on a concrete cradle.

The riser structure is 38.5 feet high and 9.17 feet wide normal to the axis of the dam. The inside of the riser has an opening 2.5 feet long parallel to the embankment and 7.5 feet wide normal to the axis of the dam, which is the same size from the top of the riser to the invert. The walls of the riser are 18 inches thick for the first 3.5 feet from the top of

PHASE I INSPECTION REPORT

WASHINGTON MOUNTAIN LAKE DAM

SECTION 1

PROJECT INFORMATION

1.1 General

(a) Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Tighe & Bond/SCI has been retained by the New England Division to inspect and report on selected dams in Massachusetts. Authorization and notice to proceed were issued to Tighe & Bond/SCI under a letter of October 24, 1979 from Colonel William E. Hodgson, Jr., Corps of Engineers. Contract No. DACW-33-80-C-005 has been assigned by the Corps of Engineers for this work.

(b) Purpose

1) Perform technical inspection and evaluation of non-federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-federal interests.

2) Encourage and prepare the states to initiate quickly effective dam safety programs for non-federal dams.

3) Update, verify, and complete the National Inventory of Dams.

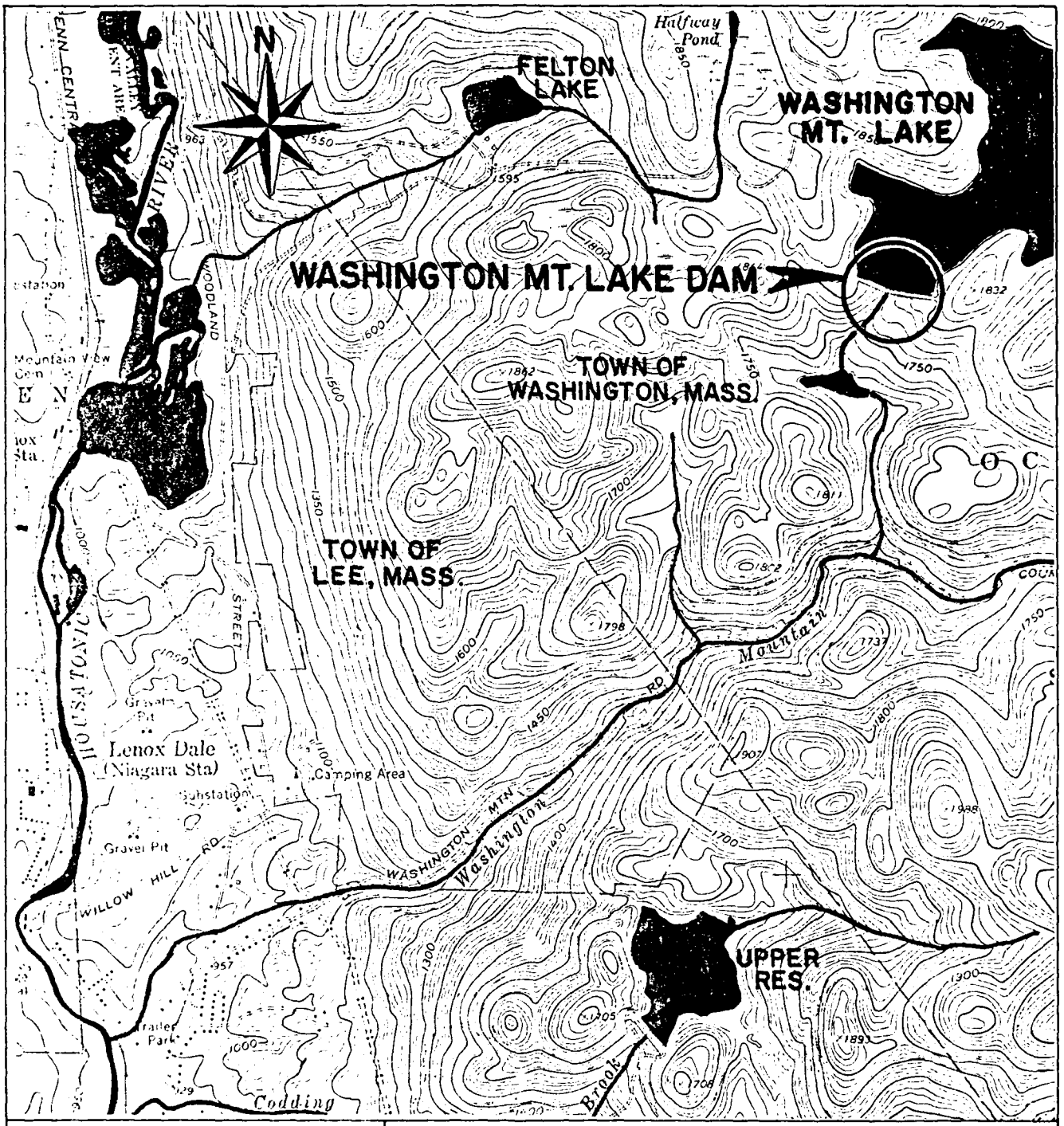
(c) Scope

The Program provides for the inspection of non-federal dams in the high hazard potential category based upon location of the dams, and those dams in the significant hazard potential category believed to represent an immediate danger based on condition of the dams.

1.2 Description of Project

(a) Location

The Washington Mountain Lake Dam is located in the watershed of Washington Mountain Brook approximately 3 miles upstream of the confluence of the Housatonic River and Washington Mountain Brook in Lee, Massachusetts. It can be reached by way of Mass.



- SCALE -
1000' 0 1000' 2000' 3000'

FROM: U.S.G.S. EAST LEE, MASS. QUADRANGLE MAP

QUADRANGLE LOCATION

TIGHE & BOND / SCI
CONSULTING ENGINEERS
EASTHAMPTON, MASS.

U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

LOCUS PLAN 2

WASHINGTON MOUNTAIN LAKE DAM (MA 318)
BERKSHIRE COUNTY MASSACHUSETTS

SCALE: AS NOTED
DATE: DECEMBER 1979

SECTION 4 - OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 Operational Procedures

No written operational procedures are available for this dam. The dam is normally self regulating.

4.2 Maintenance Procedures

An annual inspection is made by the Soil Conservation Service and recommendations resulting from this inspection are implemented by the Commonwealth of Massachusetts, Division of Forests and Parks (see copies of inspection reports in Appendix B).

4.3 Evaluation

There is need for an improved routine maintenance program as evidenced by the deficiencies noted during our visual inspection (see Section 3.2). There is no set schedule for operation of the sluice gate on the pond drain inlet; this sluice gate should be operated annually as a minimum and kept well lubricated to prevent corrosion and maintain the operator in an operable condition.

A formal, written, downstream emergency flood warning system should be developed for this dam.

SECTION 5 - EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General

The Washington Mountain Lake Dam is a Soil Conservation Service (SCS) flood control and recreation dam on Washington Mountain Brook in Washington, Massachusetts. The dam is about three miles upstream of the Town of Lee and 3 miles upstream of the confluence of Washington Brook and the Housatonic River. The upstream drainage area is 1.3 square miles with rolling hill topography.

The dam itself is a 1145 foot long earthen embankment with a grass-lined earth emergency spillway, 50 feet wide. The principal spillway consists of two weirs located on a concrete riser in the reservoir. Flow from the weirs proceeds under the dam through a 30" reinforced concrete pipe.

5.2 Design Data

The data sources available for Washington Mountain Lake Dam include the Soil Conservation Service's (SCS) "Hydrology and Hydraulics" Design Calculations. These calculations include Storage-Elevation and Stage-Discharge curves for the dam, and the routing of storms of various magnitudes through the reservoir. These calculations are dated 1971 and 1972.

Also availabe are Soil Conservation Service "As Built" plans dated 1973 and 1974.

The SCS established the elevatio: of the low stage outlet at 1797.98 feet MSL. The elevation of the high stage and emergency spillway (1801.0 feet MSL) was established at the 100-year flood stage in the reservoir. The top of dam (1804 feet MSL) was set slightly above the highest elevation of the Design High Water (1,803.1 MSL).

5.3 Experience Data

No records of flow or stage are known to be available for Washington Mountain Lake Dam, with the exception of debris on the upstream slope indicating the maximum level reached elevation 1793± MSL.

5.4 Visual Observations

The emergency spillway is a grass-lined earth channel, with its crest at 1801 feet MSL and 2:1 side slopes. Outflow from the emergency spillway does not feed into Washington Mountain Brook immediately. It runs through a minor channel and a shallow sloping area to the South before joining Washington Mountain Brook about 4,000 feet downstream. The principal spillway consists of a concrete riser structure in the reservoir with two weirs. The flow from these weirs combines in the

riser and flows under the dam through a 30 inch reinforced concrete pipe 134.33 feet long.

Downstream of the dam, Washington Mountain Brook runs about 8,000 feet before reaching the first development, three houses about 10 feet above the streambed. The brook passes under Washington Mountain Road, a lightly traveled road, through a bridge with a low chord 10.6 feet above the streambed.

For the next 2,000 feet Washington Mountain Brook parallels Washington Mountain Road to the north, until the brook passes under Woodland Road. Seven houses exist along the road and are 5 to 10 feet above the brook bed. The bridge on Woodland Road has a low chord of 5.5 feet above the brook bed.

The next 2,000 feet along Washington Mountain Brook impacts four houses and a house trailer that are less than 10 feet above the brook bed. Also, the stream passes under bridges on Washington Mountain Road, Mill Street and a railroad. The low chord of the bridge on Washington Mountain Road is 4 feet above the brook bed, the low chord of the Mill Street bridge is 3.33 feet above the brook bed and the low chord of the railroad bridge is 10.5 feet above the brook bed.

The brook then flows a few hundred feet across flood plain to the Housatonic River which has a drainage area of about 240 square miles above the point of confluence.

5.5 Test Flood Analysis

The hydrologic conditions of interest in this Phase I investigation are those required to assess the dam's overtopping potential and its ability to safely allow an appropriately large flood to pass. This requires using the discharge and storage characteristics of the structure to evaluate the impact of an appropriately sized Test Flood. The original hydraulic and hydrologic design calculations of the SCS are available for this dam.

Guidelines for establishing a recommended Test Flood based on the size and hazard classification of a dam are specified in the "Recommended Guidelines" of the Corps of Engineers. The impoundment of between 1,000 and 50,000 acre feet and the height of less than 100 feet but more than 40 feet classify this dam as an INTERMEDIATE size structure.

The appropriate hazard classification for this dam is HIGH because of the significant economic losses and potential for loss of more than a few lives downstream in the event of dam failure.

As shown in Table 3 of the Corps of Engineers' "Recommended Guidelines," the appropriate Test Flood for a dam classified as INTERMEDIATE in size with a HIGH hazard potential would be the Probable Maximum Flood (PMF). The Maximum Probable Peak Flow Rate, given as the Corps of Engineers curve, assuming rolling topography is 2300 csm. The continuous flow of 2300 csm routed through the reservoir results in an outflow which does not exceed the combined spillway capacity. Therefore, the dam is safe from overtopping.

As part of their hydraulic and hydrologic design calculations for the dam, the SCS created a "Freeboard Hydrograph" and routed it through the reservoir using a storage router. The peak inflow is 10,601.2 cfs, which is 8154.7 csm on a 1.3 square mile drainage area. This, as compared to the 2300 csm given on the Corps of Engineers' "Maximum Probable Peak Flow Rates" curve assuming rolling topography, means the SCS design exceeds the Corps of Engineers MPF at peak flow period.

The SCS storage routing results in a peak outflow of 485 cfs, with the water surface at 1803± feet MSL, 1± foot below the dam crest and 5± feet above normal pool. This analysis assumes a starting water surface elevation of 1797.98 (MSL).

The combined spillway capacity is 788 cfs with water level at the crest of the dam.

5.6 Dam Failure Analysis

The peak outflow that would result from the failure of Washington Mountain Lake Dam is estimated using the procedure suggested in the Corps of Engineers, New England Division's "Rule of Thumb Guidelines for Estimating Downstream Dam Failure Hydrographs." The procedure is carried out with dam failure occurring when the water surface is at the top of the dam (1804.0 MSL).

For an assumed breach width of 40% of the dam length at half height, the failure would be 120 feet wide. The resulting flood flow would be 58,900 cfs. Also, because it is assumed that breach of the dam would occur during a flood condition, the adjacent drainage area tributary to the Washington Mt. Brook wil contribute a flow of about 18,000 cfs at the downstream impact areas.

Prior to the dam failure, the flow of 18,000 cfs from the drainage area will result in damage to five bridges and no more than two homes.

The first area to be impacted by the failure of the dam would be three houses and a bridge about 12,000 feet downstream. The bridge is on Washington Mt. Road and the houses are adjacent to the road near the bridge. The attenuated failure flow of 71,700 cfs would create a stage of 13.5 feet above the brook bed. This would cause shallow flooding at the houses but with the narrow reach the velocity would be high. Thus, there is a potential for loss of life and extensive property damage.

The next area to be impacted by the failure would be a reach about 2000 feet long where Washington Mountain Brook parallels Washington Mountain Road. At the end of the reach the brook passes under a bridge on Woodland Road. The attenuated failure flow of 70,200 cfs would create a stage of 7.5' above the brook bed.

The stage would cause extensive property damage to the seven houses along Washington Mountain Road in this reach and potential loss of life because of the high velocity flow around the houses.

The next reach is about 2000 feet long and the area to be impacted by the flood includes four houses, a house trailer, two road bridges and a railroad bridge. The attenuated failure flow of 69,000 cfs would cause a stage of 13.0 feet in this reach. In addition, because the railroad bridge cannot carry the flow, the railroad bed would be overtopped. Also flood water would overflow Mill Street to the south.

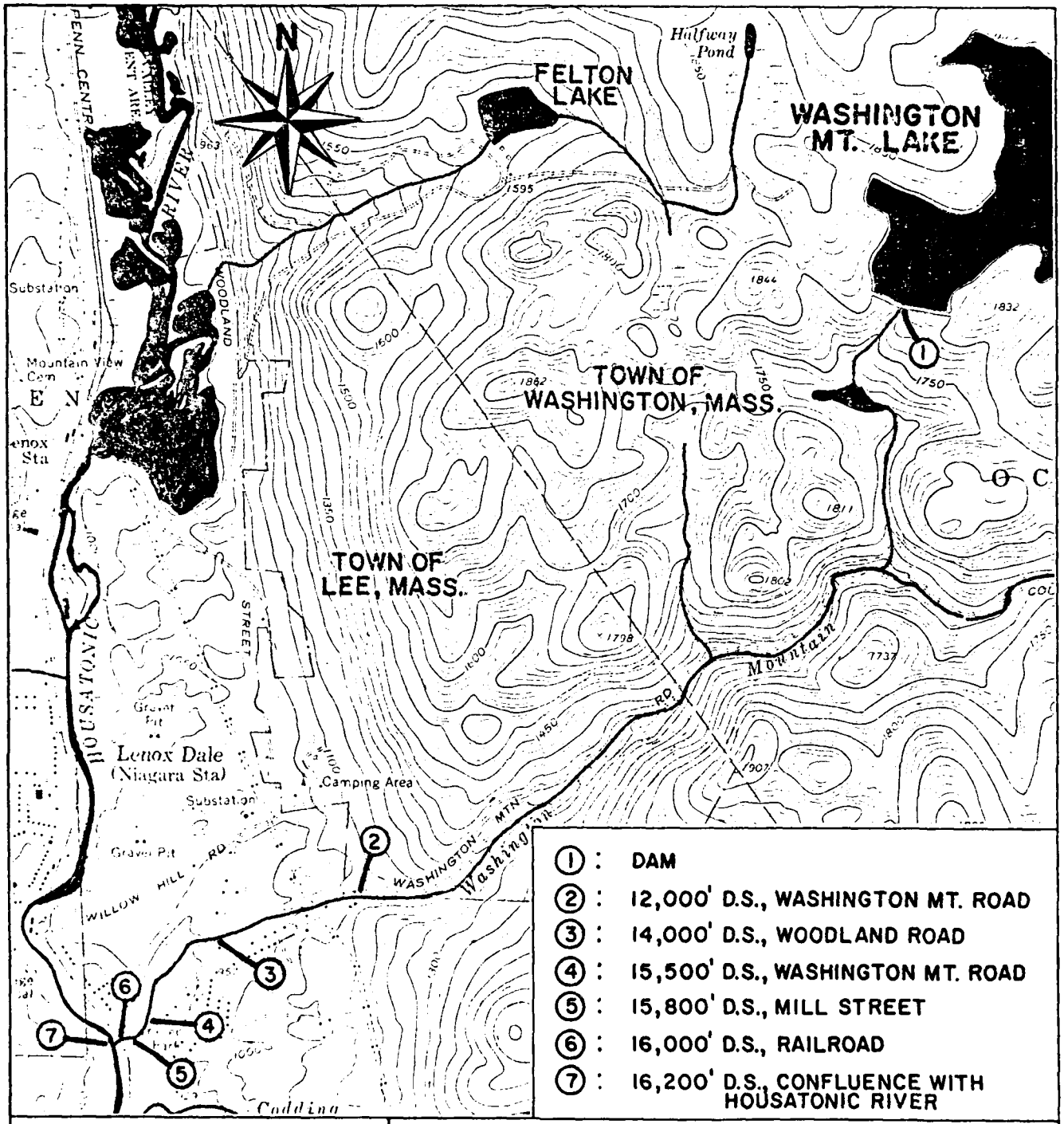
The flood flow over the railroad bed and Mill Street would have an estimated depth of 6 feet which would cause the depth of water at the railroad to be 18 feet above the brook bed.

The flood flow would cause extensive property damage and potential loss of life in this reach.

The next area impacted would be an area along Mill Street to the south where the flood water would overflow. This area contains two houses that would experience high velocity, shallow flooding as the water flows to the Housatonic River. There is a potential for loss of life and extensive property damage.

Once the failure flow passes the railroad bridge and Mill Street, the flow enters the Housatonic River. The peak dam failure flow of 69,000 cfs would be attenuated rapidly in the river channel.

The following table summarizes the downstream impacts of the failure of the Washington Mountain Lake Dam.



-SCALE-
1000' 0 1000' 2000' 3000'

FROM: U.S.G.S. EAST LEE, MASS. QUADRANGLE MAP

QUADRANGLE LOCATION

TIGHE & BOND / SCI
CONSULTING ENGINEERS
EASTHAMPTON, MASS.

U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

LOCATION AND DOWNSTREAM HAZARD MAP

WASHINGTON MOUNTAIN LAKE DAM (MA 318)
BERKSHIRE COUNTY MASSACHUSETTS

SCALE: AS NOTED
DATE: DECEMBER 1979

Probable Downstream Impact of Dam Failure
Washington Mountain Lake Dam

Location	No. of Houses Affected (After Dam Failure)	Other Damage (After Dam Failure)	Attenuated Flow (CFS) (Before Failure)	Attenuated Flow (CFS) (After Failure)	Brook Stage (Ft.) (Before Failure)	Brook Stage (Ft.) (After Failure)	Comments
1. Dam	0	0	18,000	58,900	--	--	No significant damage before dam failure
2. 12,000' Downstream of Dam at W. Mt. Rd.	3	1 bridge	18,000	71,700	6.5	13.5	Wash. Mt. Rd. is a secondary road. Before dam failure bridge inundated.
3. 2,000' Downstream at Woodland Rd.	7	1 bridge	18,000	70,200	3.5	7.5	Woodland Rd. is a secondary road. Before dam failure bridge inundated.
4. 2,000' Downstream at Railroad	4 1 (trailer)	1 R.R. bridge 2 Rd. bridges (Mill St. & W.M. Rd.)	18,000	69,000	6.5	13.0 (channel) 18.0 (R.R.)	R.R. line is major; Mill St. is a major road. Washington Mt. Road is a secondary road. Before dam failure, 2 road bridges & 1 R.R. bridge damaged.
5. Downstream of R.R. and Mill St.	2	0	18,000	69,000	5.0	Shallow high velocity flow	Before dam failure, 2 houses experience shallow-high velocity flooding.

SECTION 6 - EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observations

There has been no significant displacement or distress which would warrant the preparation of structural stability calculations.

6.2 Design and Construction Data

1) Embankment

Analysis carried out during the design and construction phase included an embankment slope stability analysis by the swedish circle method. Based on this analysis a 3 to 1 upstream slope and a 2.5 to 1 downstream slope were utilized.

2) Appurtenant Structures

A review of the structural calculations for the design of the drop inlet service spillway structure and the outlet conduit (principal spillway) revealed that these structures have been designed on the basis of sound engineering practice.

6.3 Post Construction Changes

The only post construction modification of the Washington Mountain Lake Dam has been the addition of the bottom release outlet pipe. (See page B-26).

6.4 Seismic Stability

The Washington Mountain Lake Dam is located in seismic zone No. 2. According to the recommended Corps of Engineers guidelines, a seismic analysis is not warranted.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

(a) Condition

The dam and its appurtenances are in FAIR condition due to the problems with the foundation drains.

(b) Adequacy of Information

There is sufficient design and construction data to permit an assessment of dam safety when combined with the visual inspection, past performance, and sound engineering judgment.

(c) Urgency

The recommendations and remedial measures described herein should be implemented by the owner within one year of receipt of this Phase I Inspecton Report.

7.2 Recommendations

The recommendations of this Phase I Investigation are that the following additional studies be made under the supervision of a registered professional engineer:

(a) Investigate the source of silt in the left and right toe drains which outlet at the impact basin and determine corrective measures including reconstruction or other remedial measures for the misaligned sections of these drains.

(b) Investigate the source of the gravel and silt exiting from the toe drain pipe which outlets 365 feet left of the centerline of the outlet conduit and determine what corrective measures may be required.

(c) Closely monitor the dam during and after initial filling of the upstream pool with particular attention to be paid to the foundation drainage system; instrumentation of the drainage outlets to monitor flows may be warranted.

7.3 Remedial Measures

It is recommended that the owner institute the following remedial and/or maintenance measures:

a) Gravel the surface of the top of dam to prevent ruts and erosion if the crest is to be used as road. Otherwise, block off access to the tope of dam to prevent trespassing.

b) The top of the dam at the emergency spillway end of the dam should be filled so that the elevation at this point matches the design finish grade.

c) Trespassing on the spillway slopes should be discouraged.

d) Debris in the 12" bottom release outlet pipe should be removed and a screen placed over both ends to prevent continuing vandalism.

e) The change in slope of the 20" drain pipe should be investigated and repairs made if required.

f) The damaged shaft on the gate operator should be replaced, missing nuts replaced at the base and the concrete base repaired.

g) The damaged concrete around the outlet pipe in the impact basin should be repaired to protect the reinforcing that is exposed.

h) Implement and intensify a program of periodic maintenance including repairs to structures that are vandalized, prevention of trespassing on slopes and routine checks of the foundation drain systems.

i) Operate the pond drain sluice gate at least annually as a maintenance check and keep the operator well lubricated.

j) Prepare a formal written downstream emergency flood warning system.

k) Continue the program of annual periodic technical inspections.

7.4 Alternatives

There are no meaningful alternatives to the above recommendations.

APPENDIX A

Visual Check List With Comments

Act that the "Secretary [of the Army, acting through the Chief of Engineers] may issue permits, after notice and opportunity for public hearing for the discharge of dredged or fill material into the navigable waters at specified disposal sites."

1.7a To obtain permits for activities requiring them an applicant submits a form to the District office before beginning any work. Applicants furnish a detailed project description including drawings, lists of adjoining property owners and status of approvals or certifications required by other federal and state agencies. Once the application is received, it is acknowledged, processed and a public notice is issued. Normally, there is a 30-day comment period when federal, state and local agencies, individuals and special interest groups may review the application considering various environmental, and public interest factors. A public hearing may also be held during the 30-day period. All comments are then considered by the Corps in evaluating applications. If no serious objections or questions are raised, about 60 days are needed for the process. If the application is approved the applicant signs the document, returning it with a fee, and the permit is issued.

1.8 The Mobile District, Corps of Engineers has three administrative options available to it regarding the disposition of permit applications for structures and activities associated with oil and gas development projects. These are as follows:

- o Grant a permit as requested.
- o Grant a permit with restrictions or conditions.
- o Deny a permit.

INTENT, PURPOSE AND NEED FOR THE GENERIC ENVIRONMENTAL IMPACT STATEMENT

1.9 The District Engineer of the Mobile District, U.S. Army Corps of Engineers has determined that possible future development of hydrocarbon resources in the coastal areas of Alabama and Mississippi could potentially have a significant cumulative effect on the human environment, thereby requiring the preparation of an environmental impact statement under the provisions of the National Environmental Policy Act (NEPA). The intent of the study is to identify and consider the environmental effects that could result if permits are requested from and issued by the District for hydrocarbon resource development projects in the study area. These effects are to be considered in conjunction with hydrocarbon resource development activities that could occur in contiguous federal waters. The cumulative effects identified in this document must be considered in deliberations by the District Engineer for future permit applications.

INSPECTION CHECK LIST

PARTY ORGANIZATION

PROJECT Washington Mt. Lake Dam

MA 00318

DATE 11/2/79

TIME 8:30 A.M.

WEATHER Cool and Cloudy

W.S. ELEV. 1771 U.S. 1760 DN.S.

PARTY:

1. J.W. Powers, P.E., Proj. Manager
2. G.H. McDonnell, P.E., Hydrology/ Hydraulics
3. D.L. Lenart, P.E., Civil
4. E.A. Moe, P.E., Soils/Hydraulics
5. H.A. Koski, Civil
6. _____
7. _____
8. _____
9. _____
10. _____

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	All project features were inspected by all party members.		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Also present:
R. Curran, U.S.D.A., Soil Conservation Service
C. Curtin, Massachusetts Division of Forests and Parks

INSPECTION CHECK LIST

PROJECT Washington Mt. Lake Dam DATE 11/2/79

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITIONS
EMBANKMENT	
Crest Elevation	1804.0 (Ruts from vehicles)
Current Pool Elevation	1771.0 (Intake invert)
Maximum Impoundment to Date	5' ± below normal spillway elevation
Surface Cracks	None
Pavement Condition (riprap)	Upstream condition good Downstream condition good
Movement or Settlement of Crest	None (crest used for road) Some erosion noted in wheel ruts
Lateral Movement	None
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Right abutment good Left abutment good
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Upstream slope good condition
Vegitation on Slopes	Downstream slope none apparent
Sloughing or Erosion of Slopes or Abutments	None
Rock Slope Protection - Riprap Failures	None
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	None
Piping or Boils	None
Foundation Drainage Features	Left drain 4", open with slight flow 1/3 full gravel. Right drains 4", silt in pipe and damaged pipes. Channel at toe of dam in good condition.
Toe Drains	
Instrumentation System	None

-AS-TRIAL
/22/76

ERATION AND MAINTENANCE
INSPECTION RECORD

U.S. Dept. of Agriculture
Soil Conservation Service

oject WASHINGTON MOUNTAIN ~~LAKE~~ BROOK Inspection Date 5/27/76

te Name/No. 3 (WASHINGTON MT LAKE Type MULTIPURPOSE

pe of Inspection: Special ☐ Structure Operation: Satisfactory ☐
Annual ☑ Unsatisfactory ☐

onsoring Local Organization:

esent for Inspection: Edward Callahan CARL L. CURTIN
and Lawyer W.F., Ronald Thompson, Jesse Eleazer

ITEM	Condition * S or U	Maintenance & Needed Repairs	Estimated Costs	Agreed Date Repairs to be Complet
. Vegetation	U	CROWN VETCH FERTILIZE 400#-0-20-20 E.S. AND ADJOINING AREA FERTILIZE 400#-15-15-15	2000.	SEPT 30, 1976
. Fences	S			
. Principal Spillway	S			
. Emergency Spillway	S	REMOVE BRUSH & FALLEN TREE	100.00	SEPT 1976
. Embankment & Riprap	S			
. Reservoir Area	S	AREA BEING CLEARED		
. Gates or Valves	S			
. Outlet Channels	S			
. Structure Drainage Outlets	S	Remove logs + brush INSTALL RODENT GUARD - DRAIN PIPE	100.00	SEPT 1976
0. Access Rd.	S	REGRADE AND USE GRAVEL WHERE NECESSARY		SEPT 1976
SPOIL AREA	S	CRUSHED STONE IN THICK HEAD (1 LOAD)	150.00	SEPT 1976

(REMARKS: over) * S = Satisfactory; U = Unsatisfactory

When clearing contract complete, resent top of dam and replace gate.

District Conservationist (Project Engineer) (Chief Engineering Aide)

Report due annually: July 1)

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

29 Cottage Street, Amherst, Massachusetts

Date: June 2, 1976

SUBJECT: AS - Distribution of Operation and Maintenance Inspection Report/s (PL 566)

TO:

1. Charles Kennedy (2 copies)
Director and Chief Engineer
Division of Water Resources
Mass. Dept. of Environmental Mgt.
100 Cambridge Street
Boston, MA 02202

Bette Woody, Commissioner
Mass. Dept. of Environmental Mgt
100 Cambridge St.
Boston, MA 02202

2. Soil Conservation Service
District Conservationist/s
R. Thompson
Project Engineer
Elasmar
State Administrative Officer
(file copy)
State Conservation Engineer

Chairman, Board of Selectmen
Town Hall
Lee, Mass. 01238

Chairman, Berkshire Cons. District
c/o Pittsfield SCS

C. Curtin
Mass. Div. of Forests and Parks
Pittsfield State Forest
Cascade Street
Pittsfield, MA 01201

Enclosed are reports of the O&M inspection held in the Washington Mt. Brook (watershed) for the sites listed below:

Site	Date Inspection Performed
Washington Mountain Lake	5/27/76

Sincerely,

C. E. Elasmar

Dr. Benjamin Isgur, Actg
State Conservationist

1 Enclosure/s

NRCS-TRIAL
5/2/76

OPERATION AND MAINTENANCE
INSPECTION RECORD

U.S. Dept. of Agriculture
Soil Conservation Service

Project WASHINGTON MOUNTAIN BROOK W/S Inspection Date 5/10/77

Site Name/No. WASH. MOUNTAIN LAKE Type MULTI-PURPOSE

Type of Inspection: Special ☐ Annual ☒

Structure Operation: Satisfactory ☒ Unsatisfactory ☐

Sponsoring Local Organization: BERKSHIRE CONSERVATION DISTRICT, W.R.C.

Present for Inspection: (1) Ernest Struzzeri Ron Thompson
Jamie Elsmore

ITEM	Condition * S or U	Maintenance & Needed Repairs	Estimated Costs	Agreed Date Repairs to be Complete
1. Vegetation	U	LIME + FERTILIZE 10-10-10, 1100# per NRC	2,000	Sept. 1977
2. Fences	S			
3. Principal Spillway	S			
4. Emergency Spillway	S	Remove dead spruce trees + brush	100.00	Sept 1977
5. Embankment & Riprap	S	Place gravel Top of dam / - Cut Grass, D/S slope + put with 2-4-D	1,500.00	Sept 1977
6. Reservoir Area	S	Remove brush edge of water	500.00	Sept 1977
7. Gates or Valves	S			
8. Outlet Channels	S			
9. Structure Drainage Outlets	S	Remove brush. Install animal guard (Brass Pipe)	150.00	Sept 1977
10. Access Rd.	S			
11. Spillway	S			

REMARKS: (over)

* S = Satisfactory; U = Unsatisfactory

Ronald E Thompson (District Conservationist) James J Elsmore (Project Engineer) Ernest Struzzeri (SLO Representative)

(Report due annually: July 1)

MATERIAL
5/22/76

OPERATION AND MAINTENANCE
INSPECTION RECORD

U. S. Dept. of Agriculture
Soil Conservation Service

Project Washington Mountain Brook W/ Inspection Date 8/17/1978
Site Name/No. Wash. Mount. Lake Type Multi-Purpose
Type of Inspection: Special ☐ Structure Operation: Satisfactory ☒
Annual ☒ Unsatisfactory ☐
Sponsoring Local Organization: Berkshire Conservation Dist. WRC.
Present for Inspection: Edward Carlson Dept Asst State Forest, P. Soriero
Joseph Dini Owner, DPW W.M. Murray Asst Prof Selectman, T. Doucette Res. Ice Dam
Ronald Thompson D.C. Ray Curran, JAMES ELLSMAR, SCS

ITEM	Condition * S or U	Maintenance & Needed Repairs	Estimated Costs	Agreed Date Repairs to be Complete
1. Vegetation	S	LIME, FERTILIZE TOP DAM, 3 TON/ACRE 10-10-10,	2 500 -	SEPT 30, 1
2. Fences	S			
3. Principal Spillway	S			
4. Emergency Spillway	S			
5. Embankment & Riprap	S	DIKE, PULL HARDY OLD VEGETATION ON SLOPES, OR CUT + TREAT W/2-4-D HERBICIDE. CUT + TREAT W/2-4-D HERBICIDE SLOPES OF DAM	2,000 -	OCT 30, 197
6. Reservoir Area	S			
7. Gates or Valves	S			
8. Outlet Channels	S	REMOVE GROWTH CHANNEL + SLOPES	500 -	OCT 30, 197
9. Structure Drainage Outlets	S	INSTALL ANIMAL GUARD AT DRAIN PIPE (SEEP HOLE TO BE PLUGGED.	200 -	OCT. 30, 197
10. Access Rd.	S	Needs grading	650 -	OCT. 30, 197
11. SPOIL AREA	S			

REMARKS: (over)

* S = Satisfactory; U = Unsatisfactory

Paul E. Thompson (District Conservationist) James A. Ellsmar (Project Engineer) Thomas P. Drake (SCS Representative)

(Report due annually: July 1)

U-15/U-16
(Project File)

OIL CONSERVATION SERVICE — OPERATION AND MAINTENANCE INSPECTION RECORD
U.S., MASSACHUSETTS
Revised 9/79
File Code 52-11-15

Project: WASHINGTON MOUNTAIN BROOK W/S Inspection Date 10/15/79
Pond Name/No. WASHINGTON LAKE Purpose MULTI-PURPOSE
Type of Inspection: Special ☐ Annual ☒ Structure Operation: Satisfactory ☒ Unsatisfactory ☐
Sponsoring Local Organization: BERKSHIRE CONSERVATION DIST W.R.C.
Present for Inspection: TED CAHALAN, B.C. CURTIN, DENGT - ED STRZEZIEFA, Ray Curran, Gary Reker - SCS, W.M. Murphy, Lee, J. Egan - Eagle, P. Scolfaro, D. Lee, MARIA BETTEGA - Chm. Bd Selectman

ITEM	Condition * (S or U)	Maintenance & Needed Repairs	Estimated Costs	Agreed Date Repairs to be complete
1. Vegetation	S			
2. Fences	—			
3. Principal Spillway	S			
4. Emergency Spillway	S			
5. Embankment & Riprap	S	PLACE GRAVEL ON TOP OF DAM OF FILL & SEED. REMOVE HARDWOOD GROWTH ON DIKE	$1000 -	MAY 1980
6. Reservoir Area	S			
7. Gates and Valves	S			
8. Outlet Channels	S	REMOVE GROWTH ON CHANNEL & SLOPES	$1300 -	MAY '80
9. Structure Drainage Outlets	S			
10. Access Rd.	S	MINOR GRADING	$250 -	MAY '80
11.				

REMARKS: (over) * S = Satisfactory; U = Unsatisfactory

(District Conservationist) (Project Engineer) (Sponsor)

3. Drawings	Title	Page No.
1	Cover Sheet	B-12
2	Plan of Storage Area	B-13
3	Plan of Storage Area	B-14
5	Plan of Damsite and Emer. Spillway	B-15
6	Fill Placement	B-16
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9	Principal Spillway - Plant Profile	B-18
13	Riser Details	B-19
19	Conduit Details	B-20
20	Reservoir Drain Inlet Details	B-21
21	Impact Basin Details	B-22
27, 28, 29	Logs of Test Holes	B-23-25
1 of 1	Riser Modification (Bottom Release)	B-27

APPENDIX B

ENGINEERING DATA

INDEX

1. Design and Construction Records

The following records are kept on file by the US Department of Agriculture, Soil Conservation Service, and may be obtained through their office located on Cottage Street in Amherst, Massachusetts.

Design records include the following:

construction drawings
construction specifications
construction revisions
design criteria
layout
hydraulic design
foundation and embankment design
geology report
soil testing report
structural computations
quantity estimates
inspector's notes
seeding schedule

Construction records include the following:

inspector's and engineer's diaries
soil testing reports
concrete testing reports
material certifications
equipment guarantees
correspondence
quantities
pay estimates
"As Built" drawings

2. Prior Inspection Reports

APPENDIX B

ENGINEERING DATA

INSPECTION CHECK LIST

PROJECT Washington Mt. Lake Dam DATE 11/2/79

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	
a. Super Structure	
Bearings	
Anchor Bolts	N/A
Bridge Seat	
Longitudinal Members	
Under Side of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

INSPECTION CHECK LIST

PROJECT Washington Mt. Lake Dam DATE 11/2/79

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Good condition (brook good)
Slope Conditions	Good
Bottom Conditions	Stone and gravel
Rock Slides or Falls	None
Log Boom	None
Debris	Some debris on trash rock
Condition of Concrete Lining	Pipe in good condition. Slope flat for 3 lengths, some debris in upper conduit
Drains or Weep Holes	N/A
b. Intake Structure	
Condition of Concrete	Good but rough patch around downstream flow conduit.
Stop Logs and Slots	N/A
Trash rock	Both bars of trash rock in good conditi

INSPECTION CHECK LIST

PROJECT Washington Mt. Lake Dam DATE 11/2/79

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	Good but some vandalism
Condition of Joints	Good
Spalling	Some chips from vandals
Visible Reinforcing	None
Rusting or Staining of Concrete	Some rust stain on L & R sides
Any Seepage or Efflorescence	Some on left side of tower
Joint Alignment	Good
Unusual Seepage or Leaks in Gate Chamber	None
Cracks	None noted from limit of inspection
Rusting or Corrosion of Steel	Some slight amount on grouting
b. Mechanical and Electrical	
Air Vents	N/A
Float Wells	N/A
Crane Hoist	N/A
Elevator	N/A
Hydraulic System	N/A
Service Gates	Rodney Hunt 28686-2 S-5002-A
Emergency Gates	Concrete cracked at base of operator. Two of four bolts loose (anchor).
Lightning Protection System	None
Emergency Power System	None
Wiring and Lighting System in Gate Chamber	None

INSPECTION CHECK LIST

PROJECT Washington Mt. Lake Dam

DATE 11/2/79

PROJECT FEATURE

NAME

DISCIPLINE

NAME

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	No access to transition ; could not inspect
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

INSPECTION CHECK LIST

PROJECT Washington Mt. Lake Dam DATE 11/2/79

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	Fair
Rust or Staining	None
Spalling	Concrete has spalled in a ring around outlet pipe
Erosion or Cavitation	None
Visible Reinforcing	Where concrete spalled around outlet
Any Seepage or Efflorescence	None
Condition at Joints	Good
Drain holes	Below water in basin;condition not known
Channel	
Loose Rock or Trees Overhanging Channel	None
Condition of Discharge Channel	Good

INSPECTION CHECK LIST

PROJECT Washington Mt. Lake Dam DATE 11/2/79

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Good
Loose Rock Overhanging Channel	Right slope has some ledge
Trees Overhanging Channel	None
Floor of Approach Channel	Good grade
b. Weir and Training Walls	Crest good slopes show vehicular traffic . Crest 51' wide.
General Condition of Concrete	N/A
Rust or Staining	N/A
Spalling	N/A
Any Visible Reinforcing	N/A
Any Seepage or Effloresence	N/A
Drain Holes	N/A
c. Discharge Channel	Good condition
General Condition	Good condition
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Trees at end
Floor of Channel	Good grass growth
Other Obstructions	None Top of slope at end of dam is 1.3' below crest

Arrangement

Dist of Washington Mt Rainier Nat Park

Washington Mt Rainier

1. Tom Lee (Chairman, Board of Selectmen)
2. Barbara Conn Dist. (Chairman) c/o Battlefield Mtg
3. C Kennedy, Dept of Water Res. Olympia
4. Commissioner, Navy Dept Ewell Night ? (Battle Ready)
5. ~~Dist~~ District Commissioner (Thompson) (Battlefield field office)
6. Key Engr - Site - Elsmere
7. Alvord Wash — "original"
8. (Carrie) State Chief Engr / Eng Tech
9. Attendees
10. Local Legal Mgmt/Operations/Planning Engrs
11. Dept Forests + Parks James Dinsdale Director (and Local Legal Counsel (Attorney))

June 5, 1975

REPORT OF ANNUAL INSPECTION

WASHINGTON MOUNTAIN BROOK WATERSHED

On June 4, 1975, the following met at the Washington Mountain Lake Site, Washington Mountain Brook Watershed in the town of Washington, Massachusetts for the purpose of conducting the annual inspection.

Ernest Struzziero	Water Resources Commission-Boston
Douglas Poland	Department of Natural Resources-Pittsfield
Carl Curtin	Department of Natural Resources-Pittsfield
Rick DeVergilio	Soil Conservation Service-Pittsfield
James J. Elasmar	Soil Conservation Service-Otis

General

The Massachusetts Department of Natural Resources is responsible for the operation and maintenance of this site.

Structural Conditions and Recommendations

1. Remove debris from inlet channel.
2. Remove logs and debris from inlet channel.
3. Clean out silt from inlet channel.
4. Replace animal guard, outlet of drain at impact basin.
5. Clean out 4" drain outlets at impact basin.
6. Clean out 2 culverts under Navin Road leading away from toe drain.
7. Replace barricade cable at Jam.

Douglas Poland and Carl Curtin suggested that large boulders be placed as a barricade in lieu of the cable.

The riprap at the outlet looks very good.

Report on Agronomic conditions will be submitted by Ronald Thompson.

Submitted by:

James J. Elasmar

James J. Elasmar
Project Engineer
Otis, Ma.

June 12, 1975

REPORT OF ANNUAL INSPECTION
WASHINGTON MOUNTAIN BROOK WATERSHED

On June 5, 1975, the following met at the Washington Mountain Lake Site, Washington Mountain Brook Watershed in the Town of Washington, Massachusetts for the purpose of conducting the annual inspection.

Jim Klasmar	Soil Conservation Service-Otis
Ernest Stuzzerio	Water Resources Commission-Boston
Carl Curtin	Department of Natural Resources-Pitts.
Doug Poland	Department of Natural Resources-Pitts.
Rick DeVergilio	Soil Conservation Service-Pittsfield

GENERAL

The Massachusetts Department of Natural Resources is responsible for the operation and maintenance of this site.

Agronomic Conditions and Recommendations: (6-5-75)

The top of the dam is being used as a roadway. Very little vegetation is established on this area. A reseeding of the dam top is needed.

Erosion is taking place within the roadway along the southeast side of the spillway. Water diverting and reseeding is needed. The area in general should be closed to vehicular traffic.

A fallen tree needs to be removed from spillway. Spillway and other seeded areas should be mowed once a year.

Some erosion is taking place just west of outlet.

Vehicular traffic is causing some erosion upon side slope of spoil area.

Submitted by:

Richard DeVergilio
Soil Conservationist
SCS, Pittsfield, Mass.

rrk

Recommendations:

Vegetated areas should be limed with 3 tons/acre and fertilized with 400 lbs of 5-10-10/acre. Areas being used as roads should be reseeded. Also, the erosion taking place at the left end of the spillway should be corrected. Seeding mixtures should be equivalent to that originally specified.

Submitted by:

R. E. Thompson,
District Conservationist
SCS, Pittsfield, Mass.

rrk
cc: James Elasmar, Otis

Next Copy Due 6/27/75
Kept till 6/12/75
Workflow Not Completed after
Sent 7/3/75

Initial Response

1 ✓ [illegible] (Beverly Hospital)
2 ✓ [illegible] (Chelsea)
3 ✓ [illegible] (Revere)
4 ✓ [illegible] (Winthrop)
5 ✓ [illegible] (engineer) plans for site complete
6 ✓ [illegible]
7 ✓ [illegible]
8 ✓ [illegible] (Everett) ✓
9 ✓ [illegible] (Malden) ✓
10 [illegible]
11 [illegible]
12 [illegible]
13 [illegible]
14 [illegible]
15 [illegible]
16 [illegible]
17 [illegible]
18 [illegible]

July 2, 1974

REPORT OF ANNUAL INSPECTION
WASHINGTON MOUNTAIN BROOK WATERSHED

On June 27, 1974, the following met at the Washington Mountain Lake Site, Washington Mountain Brook Watershed in the Town of Washington, Massachusetts for the purpose of conducting the annual inspection.

Bruno Cadenelli	Department of Natural Resources
Kevin Maguire	Water Resources Commission-Boston
William Annable	Soil Conservation Service-Amherst
James J. Elasmar	Soil Conservation Service-Otis

GENERAL

The Massachusetts Department of Natural Resources is responsible for the operation and maintenance of this site.

Structural Conditions and Recommendations

Clear debris from inlet channel.
Remove fallen tree from Emergency Spillway.
Remove excess mulch left side of Emergency Spillway.
Replace animal guard, outlet of drain at impact basin.
Clean out 4 drain outlets at impact basin.
Replace barricade cable at dam.
Clean out 2 culverts under Navin Road leading away from the toe drain at the dike.

The condition of the concrete and the riprap at the outlet channel looks good.

Agronomic Conditions and Recommendations: (8/14/74)

The top of the dam is being used as a road which has resulted in the loss of vegetation. The spillway needs to be mowed and one fallen tree removed. The entire seeded area should be limed with two tons of lime and fertilized with 400 pounds of 5-10-10.

Some erosion is taking place to the left of the spillway at the end. This is being caused by vehicular traffic.

The trash rack needs cleaning and sediment needs to be removed.

Submitted by:

James J. Elasmar
Project Engineer

R. Thompson
District Conservationist
SCS, Pittsfield, Mass.

WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT

WASHINGTON MOUNTAIN LAKE MULTIPLE-PURPOSE DAM
RECREATION AND FLOOD PREVENTION

DRAINAGE AREA	832	ACRES
TOTAL STORAGE	3910	ACRE FEET
FLOODWATER RETARDING STORAGE TO EMERGENCY SPILLWAY CREST	685	ACRE FEET
WATER SURFACE AREA	224	ACRES
HEIGHT OF DAM	34	FEET
VOLUME OF FILL	70,000	CUBIC YARDS

BUILT UNDER THE WATERSHED PROTECTION AND FLOOD PREVENTION ACT

by

MASSACHUSETTS DEPARTMENT OF NATURAL RESOURCES

and

MASSACHUSETTS WATER RESOURCES COMMISSION

and

BERKSHIRE CONSERVATION DISTRICT

and

TOWN OF LEE

of the

COMMONWEALTH OF MASSACHUSETTS

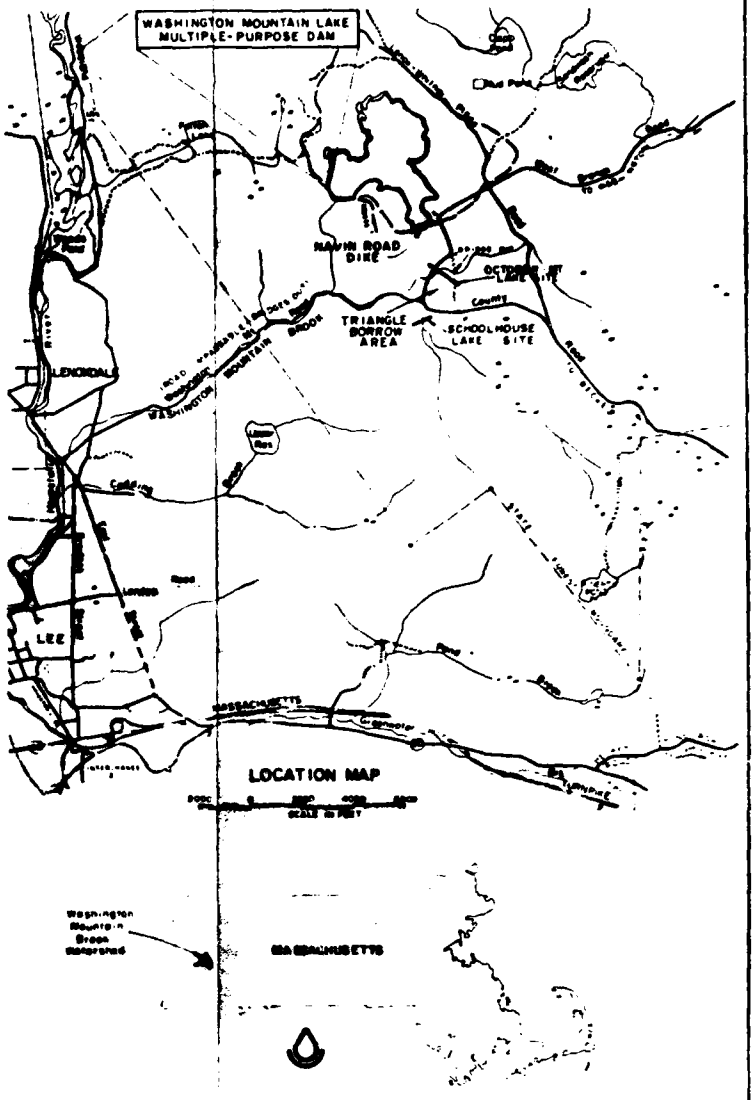
with the assistance of

SOIL CONSERVATION SERVICE

of the

UNITED STATES DEPARTMENT OF AGRICULTURE

1972



INDEX

AS BUILT

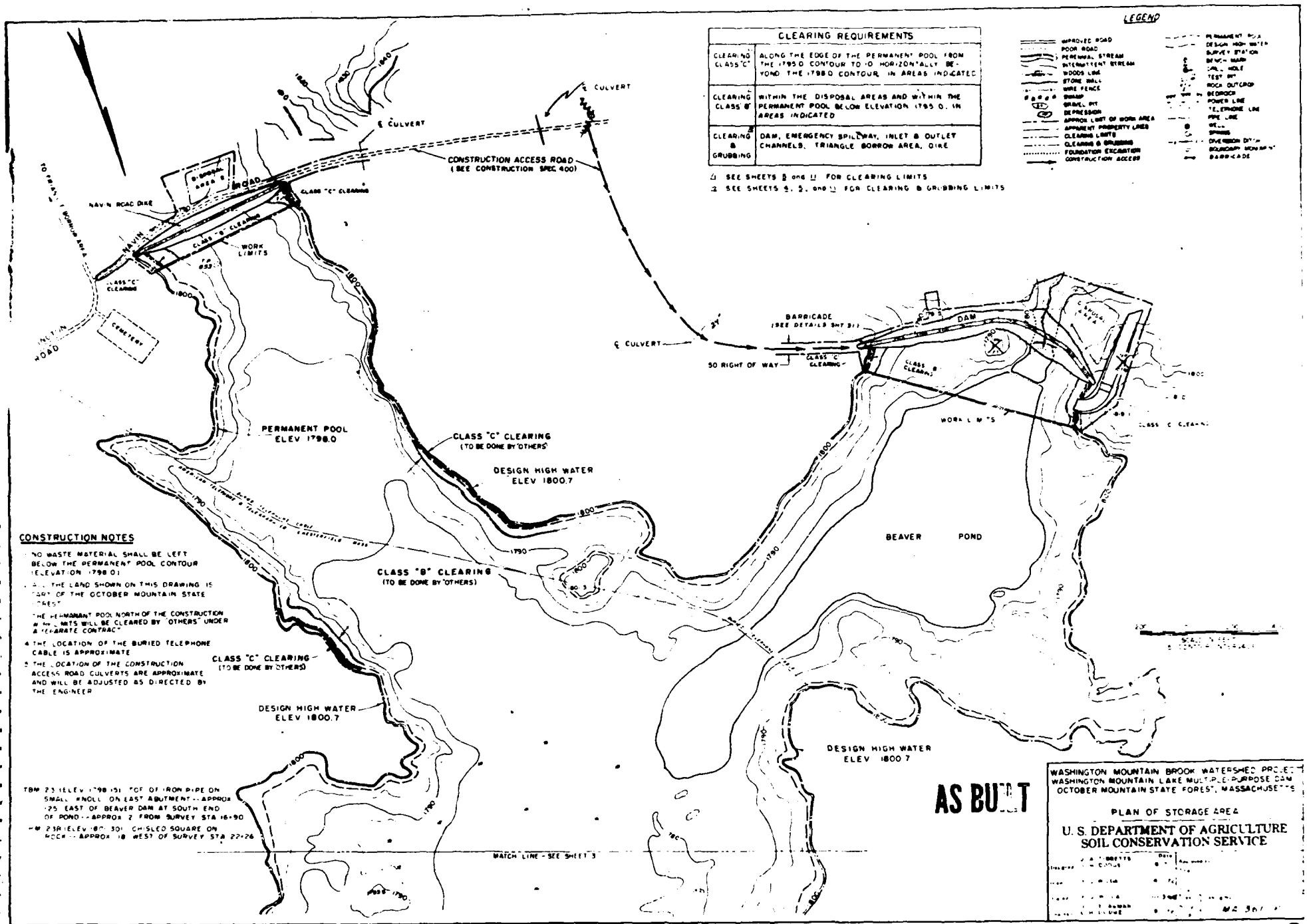
WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT
WASHINGTON MOUNTAIN LAKE MULTIPLE-PURPOSE DAM
OCTOBER MOUNTAIN STATE FOREST, MASSACHUSETTS

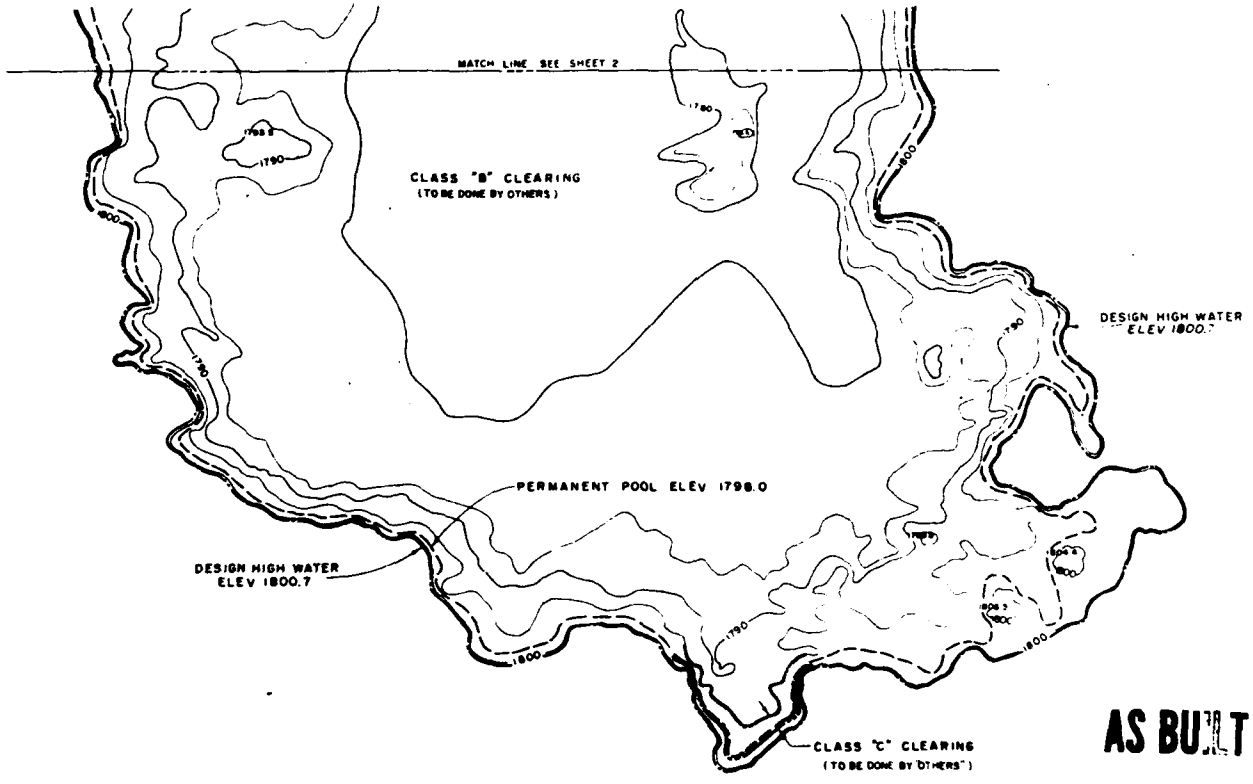
COVER SHEET

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

MA 361-P

Design





AS BUILT

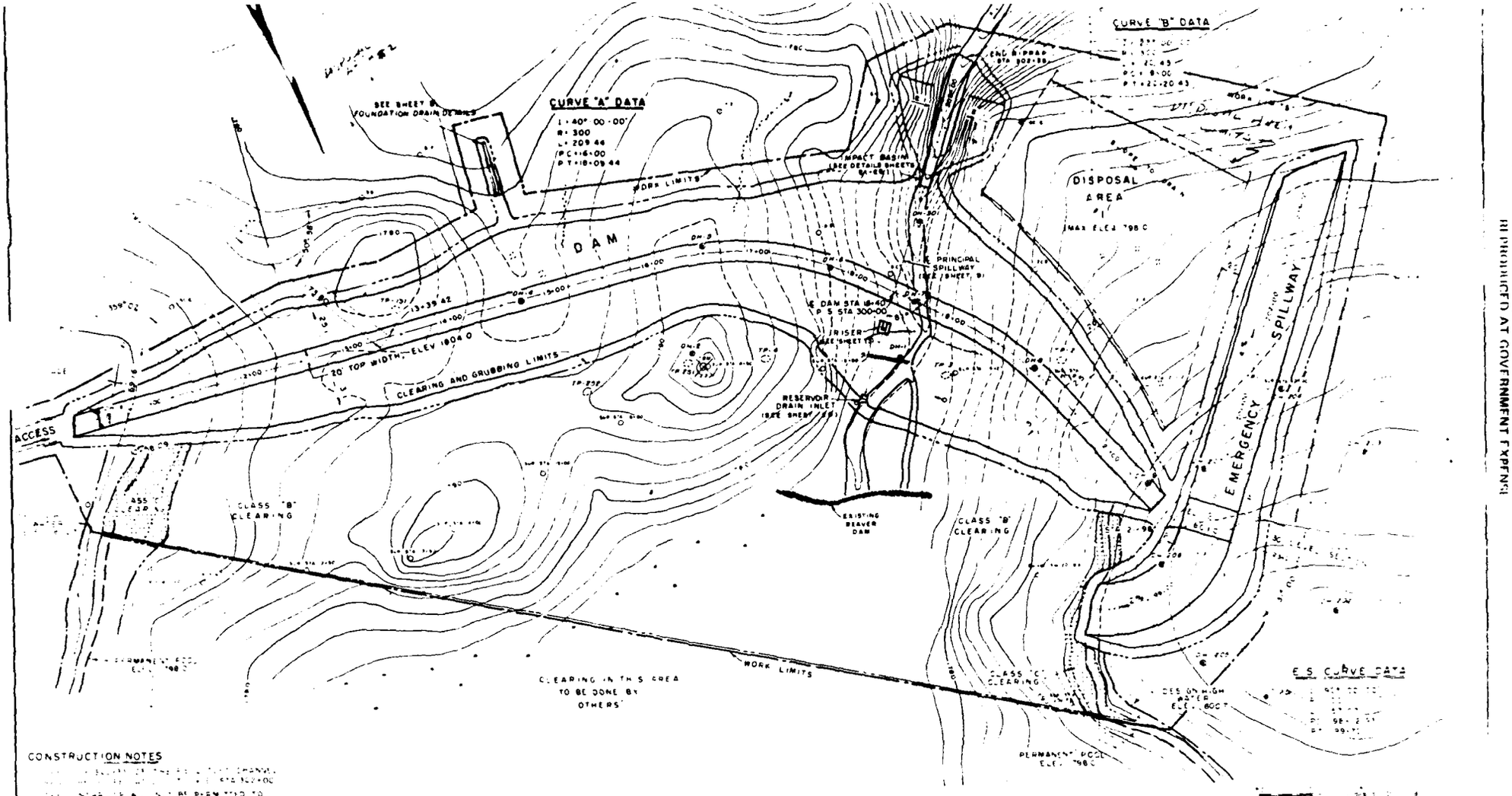
200 0 100 200
SCALE IN FEET
5 CONTOUR INTERVALS

WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT
WASHINGTON MOUNTAIN LAKE MULTIPLE-PURPOSE DAM
OCTOBER MOUNTAIN STATE FOREST, MASSACHUSETTS

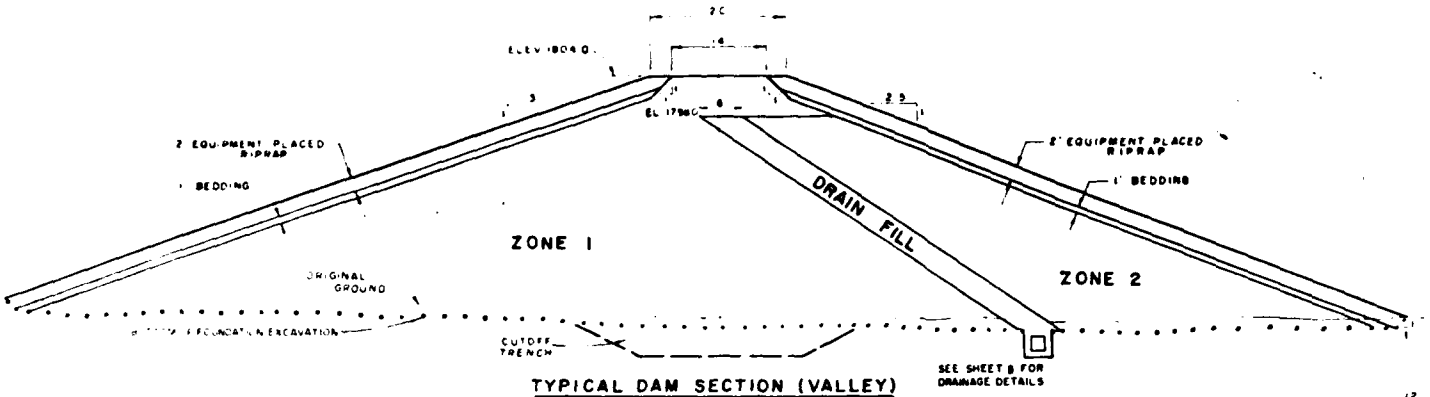
PLAN OF STORAGE AREA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

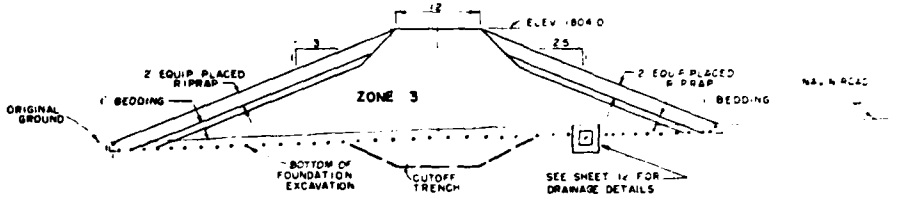
MA-361P


CURVE "A" DATA
CURVE "B" DATA
DAM
DISPOSAL AREA
EMERGENCY SPILLWAY
ACCESS
CLEARING AND GRUBBING LIMITS
WORK LIMITS
CLASS "B" CLEARING
CLEARING IN THIS AREA TO BE DONE BY OTHERS
RESERVOIR DRAIN INLET
EXISTING BEAVER DAM
PRINCIPAL SPILLWAY
RISER
IMPACT BASIN
E S CURVE DATA
CONSTRUCTION NOTES
EMBANKMENT
EQUIP PLACED RIPRAP
BEDDING
EMBANKMENT-ABUTMENT GUTTER
NOT TO SCALE
UPSTREAM STA 10+20 to 11+00
STA 21+40 to 21+70
DOWNSTREAM STA 10+25 to 10+10
STA 18+30 to 21+65
2 EQUIP PLACED RIPRAP
BEDDING
OUTLET CHANNEL
TYPICAL SECTION
NOT TO SCALE
AS BUILT
PLAN OF DAMS TE 8 EMERGENCY SPILLWAY
U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

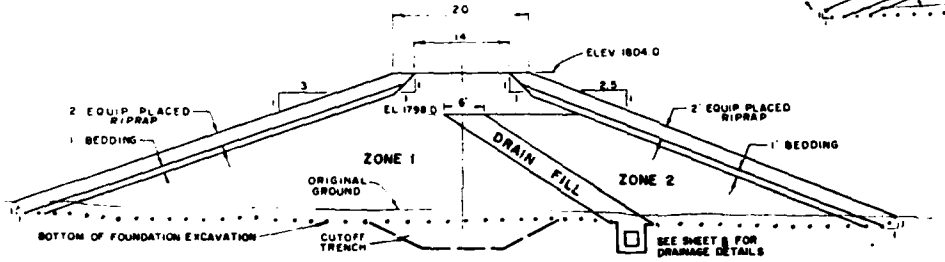
B-15



TYPICAL DAM SECTION (VALLEY)



NAVIN ROAD DIKE



TYPICAL DAM SECTION (ABUTMENTS)

6 MAXIMUM SIZE EQUAL TO THE DEPTH SHOWN. LESS THAN 75% OF THE R-RAP SHALL BE LARGER THAN 3/4 THE DEPTH SHOWN

2 BEDDING SHALL BE WELL GRADED BETWEEN No. AND 3½" WITH 30% TO 70% PASSING THE No. 8 SIEVE

3 REPRESENTATIVE ROCK SAMPLES FROM THIS WATERSHED HAVE BEEN TESTED. ALL SAMPLES TESTED CONFORM TO MATERIAL SPECIFICATION 523

EARTH FILL REQUIREMENTS

ZONE	MATERIAL	MAXIMUM ROCK SIZE	MAXIMUM LIFT Δ	MINIMUM WATER CONTENT	COMPACTION CLASS	COMPACTION DEFINITION
1	SAND, SILTY & TH GRAVEL, COBBLES AND BOULDERS REPRESENTED BY TP 57 (1-12), TP 60 (1-13), TP 6- (1-14) AND DH CV V-28", TP 152 (3-14), TP 156 (3-12), TP 159 (3-12 115M)	6"	9"	OPTIMUM	A	95% MAX DENSITY BY ASTM D698 METHOD A
2	SAND, SILTY WITH GRAVEL AND BOULDERS REPRESENTED BY DH 3 10 (1-), DH 6 (1-8 7), DH 9 (1-), DH 204 (1- 7 5), DH 206 (1- 7-), DH 207 (1- 7 5), AND TP (1- 1- 15M)	12"	18"	OPTIMUM	C	4 PASSES PER LAYER OF FILL w/ PNEUMATIC TIRED ROLLER WEIGHING AT LEAST 50 TONS
1	SAND, SILTY WITH GRAVEL, COBBLES AND BOULDERS SIMILAR TO ZONE 1	6"	9"	OPTIMUM	A	95% MAX DENSITY ASTM D698 METHOD A

Δ MAXIMUM LIFT THICKNESS PRIOR TO COMPACTION

% BASED ON STANDARD PROCTOR

AS BUILT

SCALE IN FEET

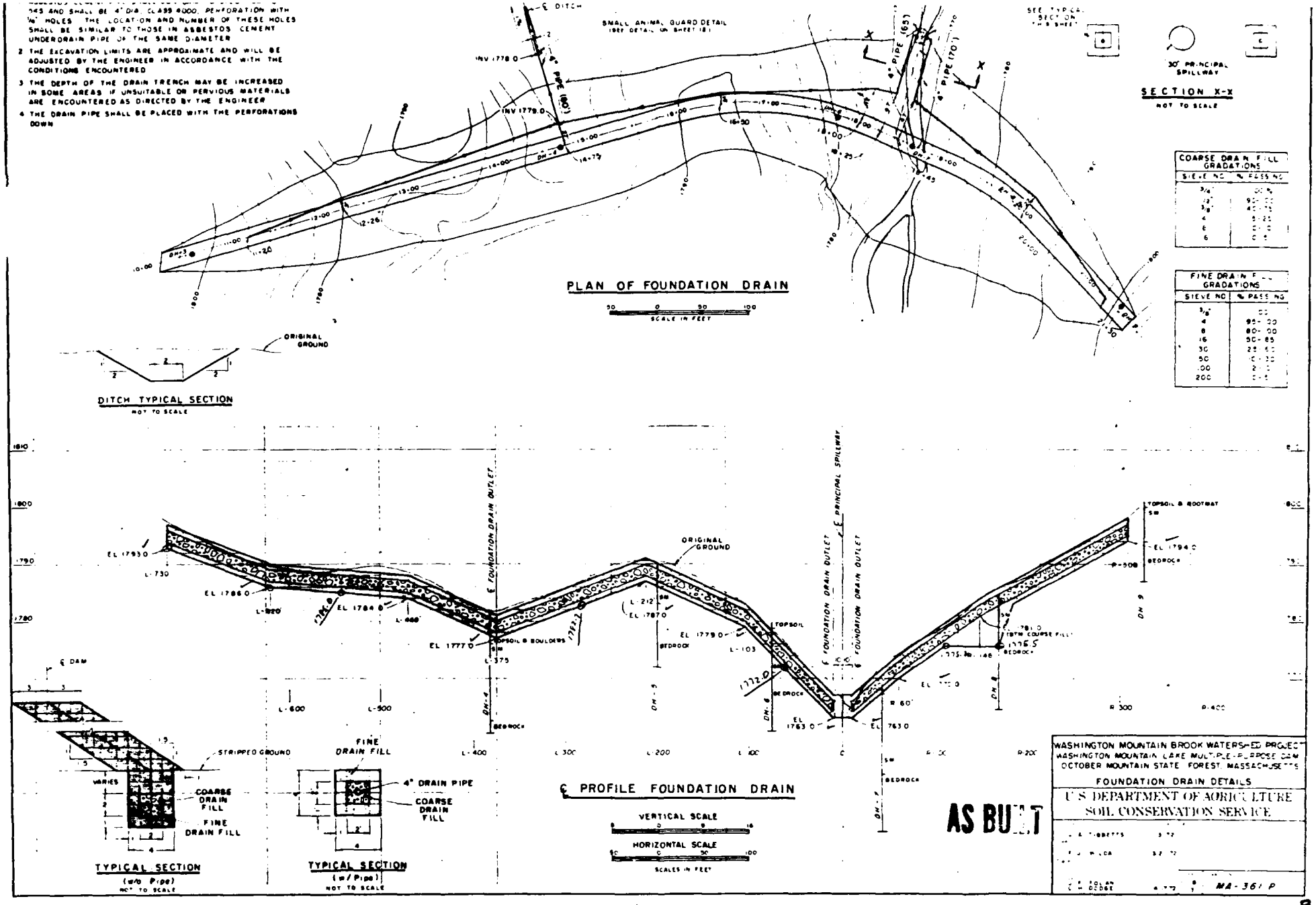
WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT
WASHINGTON MOUNTAIN LAKE MULTIPLE-PURPOSE DAM
OCTOBER MOUNTAIN STATE FOREST, MASSACHUSETTS

FILL PLACEMENT

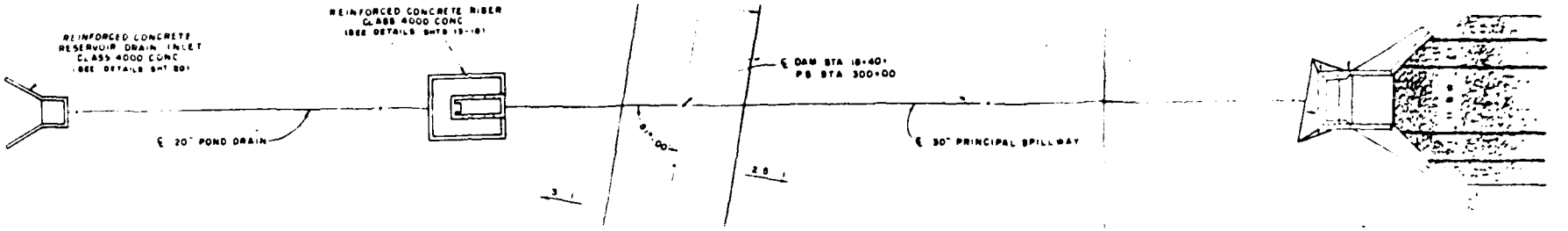
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed A.A. TIBBETTS 8-70
Drawn P.K. WILDA 6-1-71
Traced
Checked E.F. FOLAN 8-8-70
Approved
Date
Drawing No. MA 361-P

B-16



REPRODUCED AT GOVERNMENT EXPENSE



PLAN

SCALE IN FEET

20" PIPE DATA

20" REINFORCED CONCRETE WATER PIPE

(2) 4.0 SECTIONS	8.0
(1) 16.0 SECTION	16.0
(2) 20.0 SECTIONS	40.0
TOTAL	64.0

NOTE FOR THE PIPE SUPPLIER

CAST INSIDE OF BELL RING JOINT WITH CONCRETE ON ONE (1) 4.0 PIPE SECTION

20" PIPE JOINTS

JOINT	# DISTANCE FROM INLET	INVERT
INLET	0	1771.00
JA	4	1770.97
JB	20	1770.86
JC	40	1770.70
JD	60	1770.55
OUTLET	64	1770.50

ANTI-SEEP COLLARS

COLLAR	DISTANCE FROM RISER WALL	INVERT
I	10.33	1762.47
II	30.33	1762.34
III	80.33	1762.08
IV	70.33	1761.70

30" PIPE JOINTS

JOINT	# DISTANCE FROM RISER WALL	INVERT
-	0.33	1762.50
-2	20.33	1762.44
-3	40.33	1762.24
-4	60.33	1761.92
J5	80.33	1761.47
J6	100.33	1760.89
J7	120.33	1760.8
-8	128.33	1760.00
OUTLET	134.33	1760.00

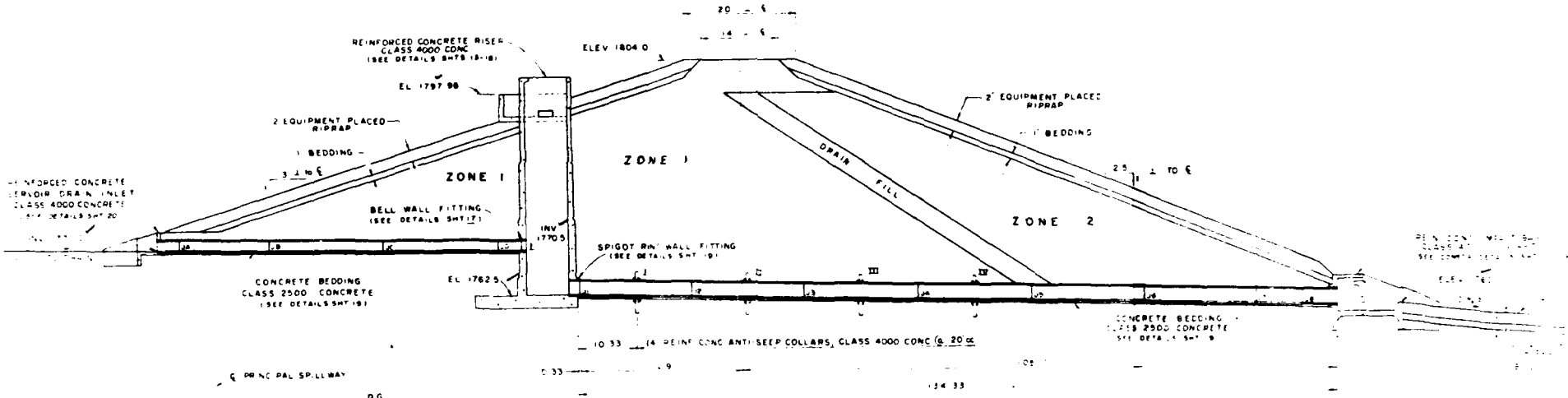
30" PIPE DATA

30" REINFORCED CONCRETE WATER PIPE

(1) 8.0 SECTION	8.0
(1) 6.0 SECTION	6.0
(6) 20.0 SECTIONS	120.0
(1) WALL FITTING	0.0
TOTAL	134.0

NOTE FOR THE PIPE SUPPLIER

CAST OUTSIDE OF SPIGOT JOINT RING WITH CONCRETE ON THE 6 PIPE SECTION



PROFILE

SCALE IN FEET

TYPICAL SECTION
PRINCIPAL SPILLWAY EXCAVATION

NOT TO SCALE

AS BUILT

WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT
WASHINGTON MOUNTAIN LAKE MULTIPLE PURPOSE DAM
OCTOBER MOUNTAIN STATE FOREST, MASSACHUSETTS

PRINCIPAL SPILLWAY PLAN & PROFILE

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

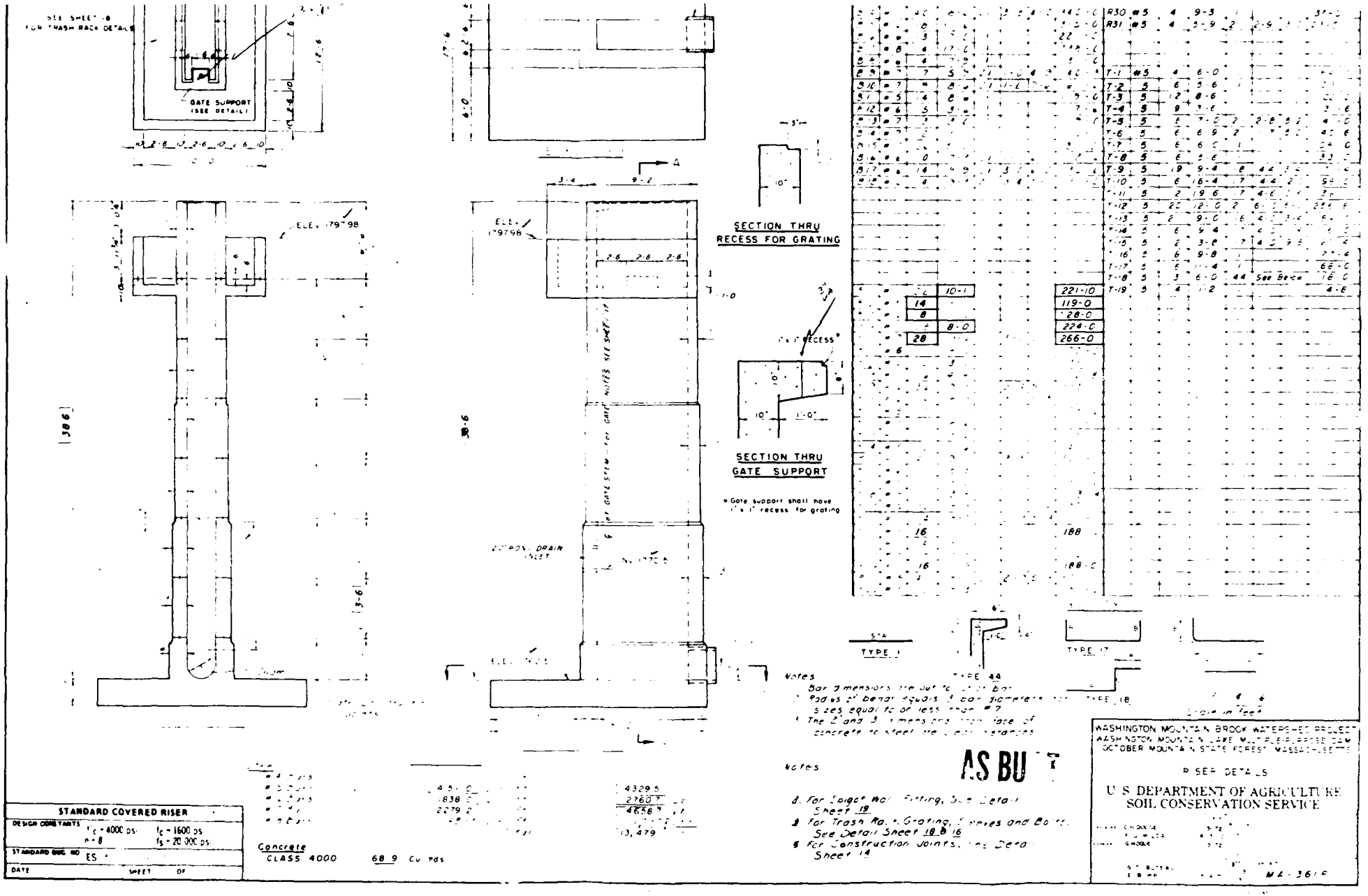

SEE SHEET 8 FOR TRASH RACK DETAILS
GATE SUPPORT (SEE DETAIL)
ELEV. 1979.98
SECTION THRU RECESS FOR GRATING
SECTION THRU GATE SUPPORT
* Gate support shall have 1" x 1" recess for grating
TYPE 1
TYPE 44
TYPE 17
TYPE 18
Notes
Bar dimensions are out to out of bar.
Radius of bend equals 3 bar diameters for sizes equal to or less than #7.
The 2 and 3 dimensions are from face of concrete to steel for clear coverages.
Notes
4. For Large Hole Fitting, See Detail Sheet 19
5. For Trash Rack & Grating, Screws and Bolts See Detail Sheet 18 & 16
6. For Construction Joints, See Detail Sheet 14
AS BUILT
STANDARD COVERED RISER
DESIGN CONSTANTS f'c = 4000 psi fs = 20,000 psi n = 8
STANDARD DWG. NO. ES
DATE SHEET OF
Concrete CLASS 4000 68.9 Cu Yds
WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT
WASHINGTON MOUNTAIN LAKE MULBERRY FORK CAM
OCTOBER MOUNTAIN STATE FOREST MASSACHUSETTS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
MA-361-P
REPRODUCED AT GOVERNMENT EXPENSE

Photo 11 - View of foundation drain outlet on left wall of impact basin looking down from east wall. Note silt from pipe held in hand of engineer.

Photo 12 - View of foundation drain 36 ft. left of impact basin looking northerly from downstream of dam. Note gravel and silt plugs outlet opening.

Photo 9 - View of principal spillway conduit outlet at impact basin looking north from basin. Note damaged concrete and exposed reinforcing bars.

Photo 10 - View of foundation drain outlet on right wall of impact basin looking west. Note damage AC pipe and plastic pipe insert.

Photo 7 - View of inside downstream flow conduit looking southerly. Note debris in conduit.

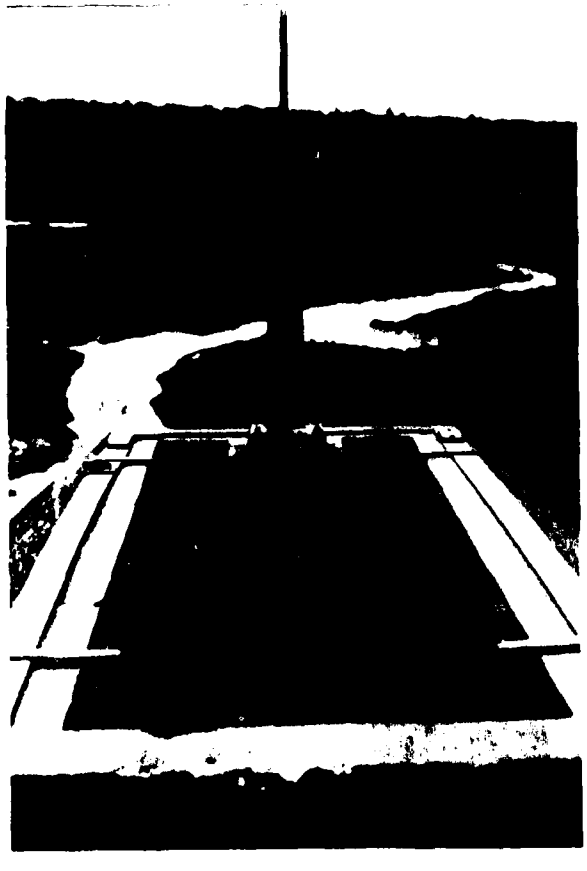


Photo 8 - View on riser crest looking northerly from upstream embankment. Note nuts missing from operator base and damage to concrete by vandals.

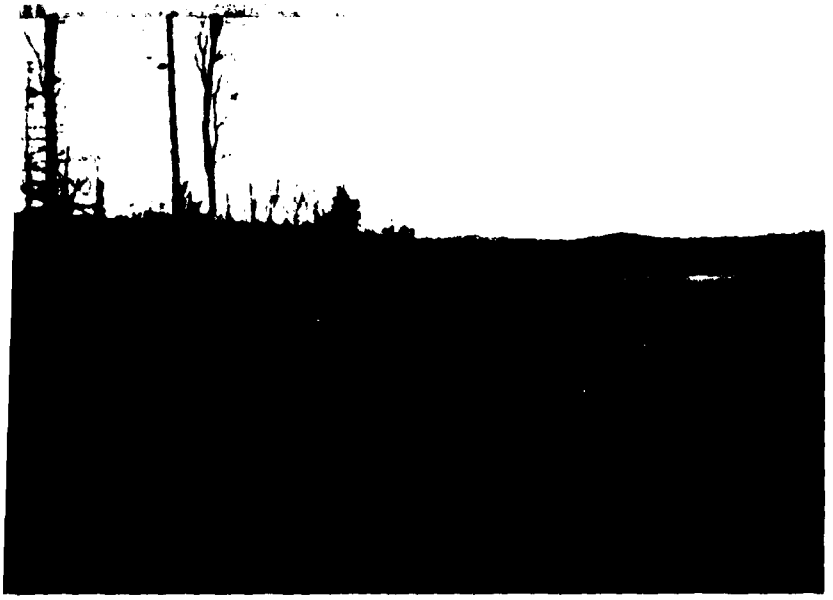


Photo 4 - Overview of approach to emergency spillway looking northerly from crest of spillway.

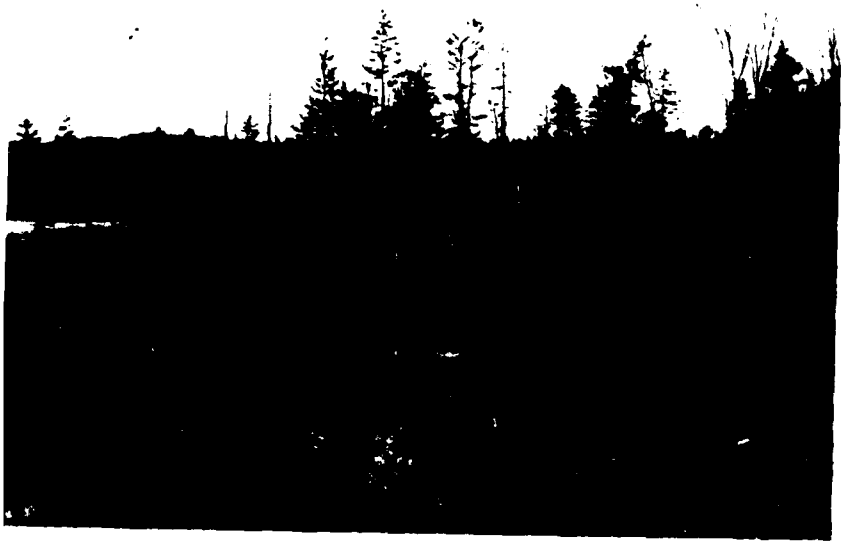


Photo 5 - Overview of discharge channel of emergency spillway looking southerly from crest of spillway.

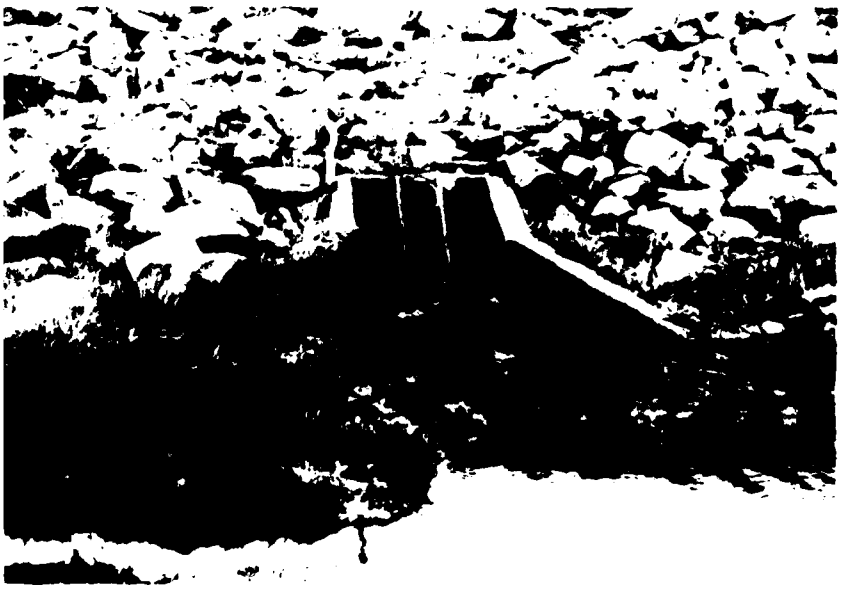


Photo 6 - View of pond drain inlet and down stream flow conduit looking south.

Photo 1 - Overview of dam looking westerly from left abutment. Note roadway on crest.

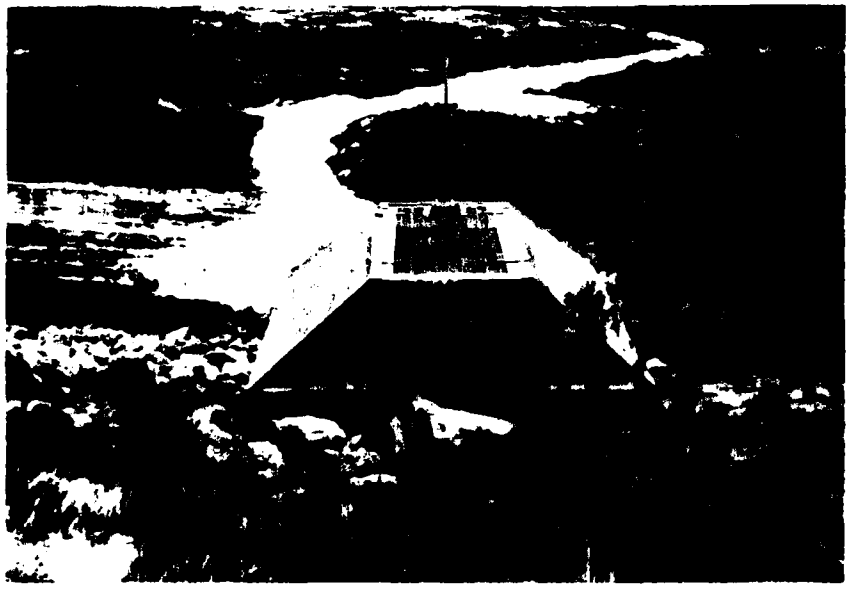
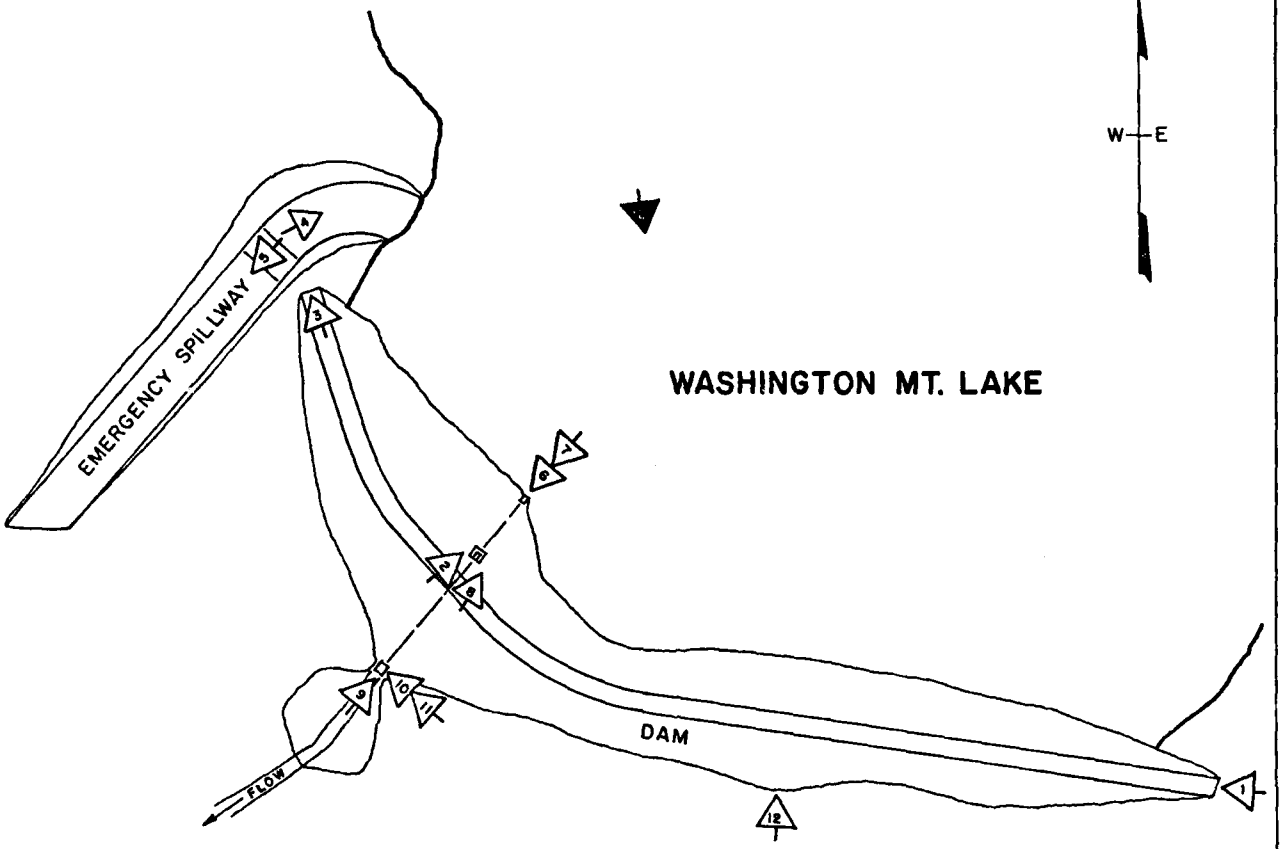


Photo 2 - Overview of impoundment area and principal spillway looking northerly from dam crest.

Photo 3 - Overview of right abutment and emergency spillway looking westerly from dam crest. Note the wheel ruts on right slope of spillway left center of photo.



OVERVIEW (AERIAL)

APPENDIX C

TIGHE & BOND / SCI CONSULTING ENGINEERS EASTHAMPTON, MASS.	U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

LOCATION AND ORIENTATION OF PHOTOS

WASHINGTON MOUNTAIN LAKE DAM (MA 318)
BERKSHIRE COUNTY MASSACHUSETTS

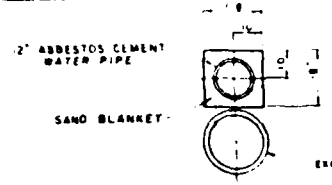
			SCALE: NONE
			DATE: DECEMBER 1979

APPENDIX C

PHOTOGRAPHS

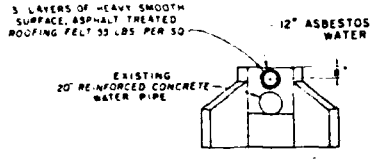
CONSTRUCTION NOTES

THE 12 ASBESTOS CEMENT WATER PIPE SHALL BE NON PERFORATED CLASS 150 TYPE S AND CONFORM TO MATERIAL SPEC 948



SECTION A-A

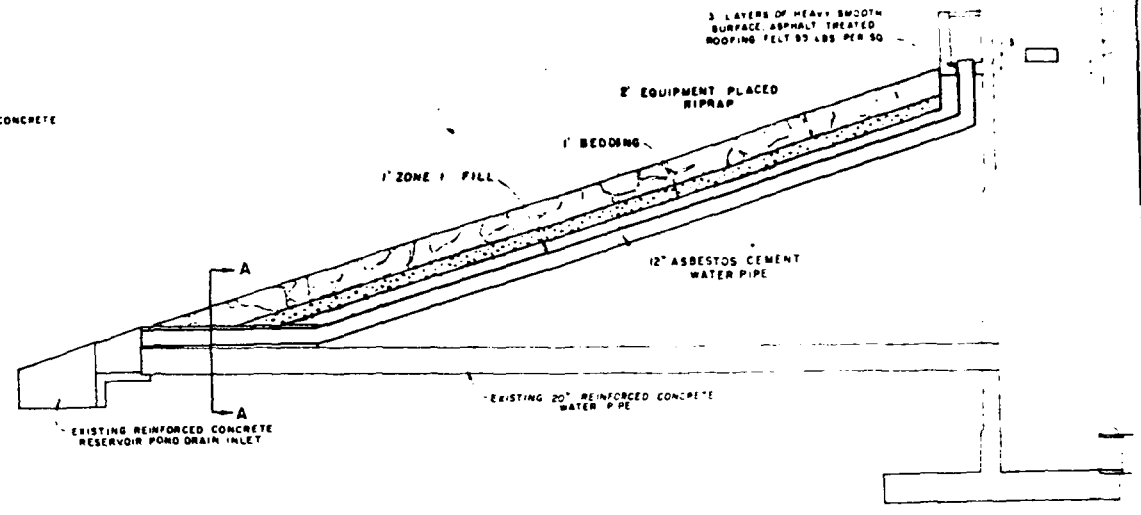
N T S



UPSTREAM ELEVATION

(POND DRAIN INLET)

N T S



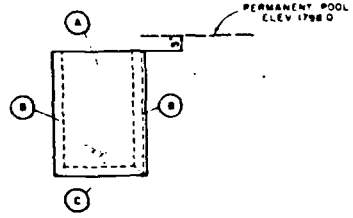
PROFILE OF 12" ASBESTOS CEMENT PIPE INSTALLATION

SCALE IN FEET

METAL WEIR BILL OF MATERIALS			
ITEM	SIZE	LENGTH	QUANTITY
A	3"-7" x 2'-8" x 1/4"	-	2
B	3" x 2" x 1/4"	3'-7"	4
C	3" x 2" x 1/4"	2'-6"	2
EXPAN BOLTS, NUTS & WASH	1/2" DIA	-	20

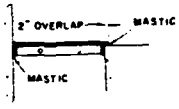
CONSTRUCTION NOTES (METAL WEIR)

1. ANGLE BARS SHALL BE WELDED TO METAL WEIR AS SHOWN IN METAL WEIR DETAILS
2. METAL WEIR SHALL BE SECURED TO RISER WITH EXPANSION BOLTS THROUGH THE ANGLE BARS THE EXPANSION BOLTS SHALL BE EVENLY SPACED APPROXIMATELY 12" ON CENTER
3. ALL CONTACT POINTS BETWEEN METAL AND CONCRETE SHALL BE SEALED WITH MASTIC TO FORM A WATERTIGHT SEAL



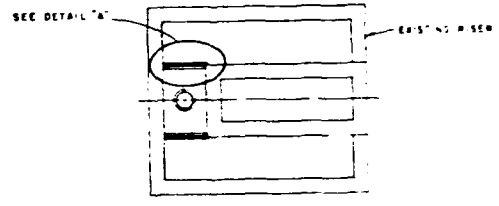
METAL WEIR DETAILS

N T S



DETAIL "A"

N T S



PLAN OF METAL WEIR

AS BUILT

COMPLETION DATE: 5-1970

CONTRACTOR: HEBERT CONSTRUCTION INC

AS BUILT

PREPARED BY JAMES FLASHER

CHECKED BY S GREENLEAF

APPROVED BY C.B. Curtis

WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT
WASHINGTON MOUNTAIN LAKE MULTIPLE-PURPOSE DAM
OCTOBER MOUNTAIN STATE FOREST MASSACHUSETTS

RISER MODIFICATION (BOTTOM RELEASE)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

MA-36-D

REPRODUCED AT GOVERNMENT EXPENSE

TP-151 — EL.EV. 1761.2 — 11/[illegible]/69 — [illegible]

[illegible]	[illegible]	TOPSOIL AND ROOT MAT.
2.[illegible]	25.[illegible]	SAND, silty with gravel, about 15% fines, 20% fine sand, 13% medium sand, 10% coarse sand, 1[illegible]% gravel, angular, gray, damp, medium permeability, dense to very dense, GLACIAL TILL.
25.0	30.0	BEDROCK, biotite, hornblende gneiss with some pyrite, slightly fractured, fractures spaced 12-18 inches apart. Most fractures dipping about 60 degrees.
30.[illegible]		Bottom of Hole.

Standard Penetration Tests

No.	Depth	Blows/Ft.	% Recovery
1.	0.0 - 1.5'	7	100
2.	1.5 - 3.0'	16	90
3.	3.0 - 4.5'	18	80
4.	4.5 - 6.0'	15	85
5.	10.0 -11.5'	73	70
6.	15.0 -16.5'	90	65
7.	20.0 -21.5'	115	50

Rock Core Runs

No.	Depth	% Recovery
1.	25.0 -30.0	50

NOTE: Water level at 5.5 feet on 11/7/69.

[illegible]-152 — EL.EV. 1755.[illegible] — 11/13/69 — [illegible]

[illegible].0	2.0	TOPSOIL AND ROOTMAT.
2.0	28.0	SAND, silty with gravel, about 15% fines, 20% fine sand, 10% medium sand, 10% coarse sand, 15% gravel, sub-round, gray, damp, medium permeability, dense to very dense, GLACIAL TILL.
28.0	29.0	BEDROCK, biotite, hornblende, gneiss with some pyrite, slightly fractured, fractures spaced 12-18 inches apart. Most fractures dipping about 60 degrees.
29.0		Bottom of Hole.

Standard Penetration Tests

No.	Depth	Blows/Ft.	% Recovery
1.	0.0 - 1.5'	4	100
2.	1.5 - 3.0'	7	100
3.	3.0 - 4.5'	30	100
4.	4.5 - 6.0'	42	70
5.	10.0 -11.5'	95	50
6.	15.0 -16.5'	93	60
7.	20.0 -21.5'	110/6" ref.	50
8.	25.0 -26.5'	131	50

NOTE: Water level not recorded.

TP-153 — EL.EV. 1735.8 — 12/1/69 — DBH

0.0	1.0	TOPSOIL.
1.0	[illegible].0	SAND, silty with gravel, cobbles and boulders, about 10% fines, 20% fine sand, 10% medium sand, 10% coarse sand, 20% gravel, angular, 18-inch maximum size, olive, damp, low permeability, dense, GLACIAL TILL, 25% cobbles and boulders.
[illegible].0		Bottom of Pit.

NOTE: No sample -- running water at 2 feet.

TP-154 — EL.EV. — 12/1/69 — DBH

0.0	1.0	TOPSOIL.
1.0	[illegible].0	SAND, silty with gravel, cobbles and boulders, about 10% fines, 20% fine sand, 10% medium sand, 10% coarse sand, 20% gravel, angular, 18-inch maximum size, olive, damp, low permeability, dense, GLACIAL TILL, 20% cobbles and boulders.
14.0		Bottom of Pit.

NOTE: Sample 152.1 -- 3 to 14 feet. Running water at 2 feet.

TP-155 — EL.EV. 1748.7 — 12/1/69 — DBH

0.0	2.0	TOPSOIL AND PEAT.
2.0	12.0	SAND, silty with gravel, cobbles, and boulders, about 10% fines, 20% fine sand, 10% medium sand, 10% coarse sand, 20% gravel, angular, 2 feet maximum size, blue-gray, moist, low permeability, dense, GLACIAL TILL, 25 cobbles and boulders.
[illegible].0		Bottom of Pit.

NOTE: No Sample -- running water at 3 feet.

TP-156 — EL.EV. 1759.1 — 12/1/69 — DBH

0.0	1.5	TOPSOIL.
1.5	12.0	SAND, silty with gravel, cobbles, and boulders about 10% fines, 20% fine sand, 10% medium sand, 10% coarse sand, 20% gravel, angular, 2.5 feet maximum size, olive, damp, low permeability, dense, GLACIAL TILL, 20% cobbles and boulders.
12.0		Bottom of Pit.

Note: Sample 156.1 -- 3.. to 12.0 ft.

TP-157 — EL.EV. 1759.1 — 12/1/69 — DBH

0.0	1.0	TOPSOIL.
1.0	12.0	SAND, silty with gravel, cobbles and boulders, about 10% fines, 20% fine sand, 8% medium sand, 10% coarse sand, 20% gravel, angular, 20-inch maximum size, olive, moist, water at 12.. feet, low permeability, dense, GLACIAL TILL, est. 20% cobbles and boulders.
12.0		Bottom of Pit.

Note: No Sample.

TP-158 — EL.EV. 1732.2 — 12/1/69 — DBH

0.0	1.0	TOPSOIL.
1.0	12.0	SAND, silty with gravel, cobbles and boulders, about 10% fines, 20% fine sand, 10% medium sand, 10% coarse sand, 20% gravel, angular, 12-inch maximum size, olive, damp, low permeability, dense, GLACIAL TILL, est. 15% cobbles and boulders.
12.0		Bottom of Pit.

Note: No Sample.

TP-159 — EL.EV. 1767.3 — 12/1/69 — DBH

0.0	1.0	TOPSOIL.
1.0	12.0	SAND, silty, with gravel, cobbles, and boulders, about 10% fines, 20% fine sand, 10% medium sand, 10% coarse sand, 20% gravel, angular, 12-inch maximum size, olive, damp, low permeability, dense, GLACIAL TILL, est. 15% cobbles and boulders.
12.0		Bottom of Pit.

Note: Sample 158.1 -- [illegible] to 12 feet.

TP-160 — EL.EV. 1754.[illegible] — 12/1/69 — DBH

0.0	1.0	TOPSOIL.
1.0	12.0	SAND, silty with gravel, cobbles and boulders, about 10% fines, 20% fine sand, 10% medium sand, 10% coarse sand, 20% gravel, angular, 18-inch maximum size, olive, damp, low permeability, dense, GLACIAL TILL, est. 15% cobbles and boulders.
12.0		Bottom of Pit.

Note: Sample 159.1 at 3. to 12.. ft.

TP-161 — EL.EV. 1760.1 — 12/1/69 — DBH

0.0	[illegible].0	TOPSOIL.
[illegible].0	13.0	SAND, silty with gravel, cobbles and boulders, about 10% fines, 20% fine sand, 15% medium sand, 10% coarse sand, 20% gravel, angular, 20-inch maximum size, olive, damp, low permeability, dense, GLACIAL TILL, est. 15% cobbles and boulders.
13.0		Bottom of Pit.

Note: No Sample.

TP-162 — EL.EV. 17[illegible].4 — 12/1/69 — DBH

0.0	1.0	TOPSOIL.
1.0	[illegible].0	SAND, silty with gravel, cobbles and boulders, about 10% fines, 20% fine sand, 15% medium sand, 10% coarse sand, 20% gravel, angular, 18-inch maximum size, olive, damp, low permeability, dense, GLACIAL TILL, est. 15% cobbles and boulders.
[illegible].0		Bottom of Pit.

Note: Sample 161.1 at 3.. to [illegible].0 ft.

LEGEND

"As Built" Markings Item

Centerline of dam	[illegible]+ 00
Borrow Area	[illegible]
Emergency Spillway	[illegible]
Centerline of Outlet Structure	[illegible]
Stream Channel	[illegible]
Test wells	[illegible]
	[illegible]
	[illegible]

BH-Drill Holes
TP-Test Pits

UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOLS

GW	Well graded gravel; gravel-sand mixtures
GP	Poorly graded gravels
GM	Silty gravels; gravel-sand-silt mixtures
GC	Clayey gravels; gravel-sand-clay mixtures
SW	Well graded sands; sand-gravel mixtures
SP	Poorly graded sands
SM	Silty sands; sand-silt mixtures
SC	Clayey sands; sand-clay mixtures
ML	Silts; silty, very fine sands; sandy or clayey silts
CL	Clays of low to medium plasticity; silty, sandy or gravelly clays
CH	Clays of high plasticity; fat clays
MH	Elastic silts; micaceous or diatomaceous silts
OL	Organic silts and organic silty clays of low plasticity
OH	Organic clays or silts of medium to high plasticity

All soil and rock description and classification were determined by visual examination in the field.

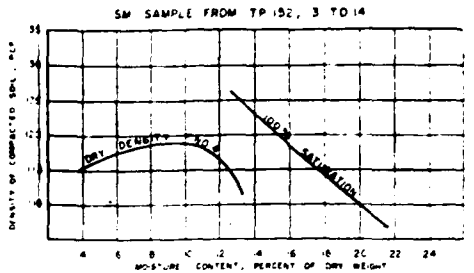
Where possible, all holes were advanced by continuous drive sampling to 6.0 feet. Holes were then advanced by 2½ diameter drilling between drive samples. Drive samples taken with a 3-inch O.D. split spoon sampler.

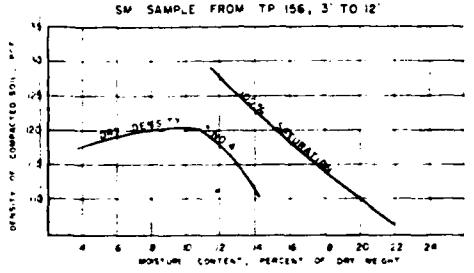
Location of Test Holes shown on Plan [illegible]

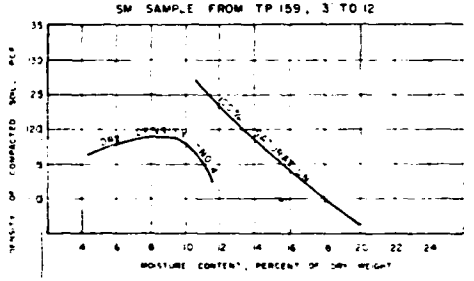
NOTE: water levels do not necessarily represent static water levels.

Psi - pounds per square inch water pressure
w/gpm - quantity of water in gallons per minute
K/ft/day - permeability in feet per day
U.S. - Undisturbed Sample

THE UNIFIED SOIL CLASSIFICATION SYSTEM CLASSIFIES ONLY THOSE MATERIALS WHICH ARE SMALLER THAN THREE INCHES.







COMPACTION CURVES- STANDARD PROCTORS

WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT
WASHINGTON MOUNTAIN LAKE MULTIPLE-PURPOSE DAM
OCTOBER MOUNTAIN STATE FOREST, MASSACHUSETTS

LOGS OF TEST HOLES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

[illegible] — [illegible] — [illegible]
C. H. DODGE — [illegible] — MA-361-P

REPRODUCED AT GOVERNMENT EXPENSE

DH-2 (cont'd) Elev. 1794.0 8/31 to 9/25/71 DBH

to 6

Diamond Hole.

Drive Samples

No.	Depth	Blo./ft.	% Recovery
1.	6.0 - 7.5	4	100
2.	8.5 - 8.5	84/1" ref.	50

Rock Core Runs

No.	Depth	% Recovery
1.	7.5 - 12.0	95
2.	12.0 - 14.0	90
3.	14.0 - 16.5	100

NOTE: Water level at 5.4 feet on 9/25/71.

DH-2.5 Elev. 1810.2 8/19 to 8/20/71 JI

0.0 1.0 TOPSOIL and ROOTS.

1.0 6.5 SAND, silty, with gravel, about 35% fines, 15% fine sand, 10% medium sand, 25% coarse sand, 10% gravel, cobble-sub-angular, 6-inch maximum size, olive-brown, damp, low permeability, dense, GLACIAL TILL.

6.5 17.0 BEDROCK, gray, very hard, feldspar-quartz-biotite gneiss with foliation dipping 65° to 90°, intruded by quartz-feldspar pegmatite vein between 6.5 feet and 11.0 feet. Highly fractured from 6.5 feet to 11.0 feet, averaged 3-inch maximum diameter. 11.0 to 17.0 feet. Fractures generally horizontal, spaced 1 to 6-inches apart from 6.5 to 11.0 feet, and 1 to 12 inches apart from 11.0 to 17.0 feet. A few fractures dip 45° to 90°.

17.0 Bottom of Hole.

Drive Samples

No.	Depth	Blo./ft.	% Recovery
1.	0.0 - 1.5	7	100
2.	1.5 - 2.8	60/10" ref.	75
3.	5.0 - 6.3	137/13" ref.	75

Rock Core Runs

No.	Depth	% Recovery
1.	6.5 - 8.0	80
2.	8.0 - 11.0	80
3.	11.0 - 14.5	100
4.	14.5 - 16.5	80

NOTE: Water level at 13.3 feet on 8/20/71.

DH-2.6 Elev. 1806.5 8/23 to 8/23/71 DBH

0.0 1.0 TOPSOIL.

1.0 7.0 SAND, silty with gravel and cobbles, about 35% fines, 15% fine sand, 15% medium sand, 25% coarse sand, 10% gravel, sub-angular, 6-inch maximum size, olive-brown, damp, low permeability, dense, GLACIAL TILL.

7.0 11.0 BEDROCK, gray, Biotite hornblende feldspar gneiss, moderately fractured except a zone from 9.0 to 10.5, that is highly fractured. Most fractures horizontal, some dipping about 50° hard.

11.0 Bottom of Hole.

Drive Samples

No.	Depth	Blo./ft.	% Recovery
1.	0.0 - 1.5	6	100
2.	1.5 - 3.3	58/8" ref.	100
3.	6.5 - 8.0	84	100

Rock Core Runs

No.	Depth	% Recovery
1.	7.0 - 9.1	75
2.	9.1 - 10.5	66
3.	10.5 - 12.0	100

NOTE: Water level dry on 8/24/71.

DH-2.7 Elev. 19.7 8/24 to 8/24/71 DBH

... 1.0 TOPSOIL and ROOT MAT.

... 7.5 SAND, silty with gravel, about 35% fines, 15% fine sand, 15% medium sand, 25% coarse sand, 10% gravel, sub-angular, 3/4-inch maximum size, olive-brown, damp, low permeability, dense to very dense, GLACIAL TILL.

... ... Boulder.

7.5 11.5 BEDROCK, gray, Biotite, hornblende feldspar gneiss, moderately fractured, fractures 3 to 6-inches apart, all horizontal, except one which is dipping about 60° hard.

...5 Bottom of Hole.

Drive Samples

No.	Depth	Blo./ft.	% Recovery
1.	0.0 - 1.5	11	100
2.	1.5 - 2.8	97/8" ref.	100
3.	6.5 - 8.0	76	90

Rock Core Runs

No.	Depth	% Recovery
1.	7.5 - 11.5	100
2.	11.5 - 14.5	100

Dry to drill water -- NOTE: Water level at 2.3 on 8/24/71

DH-3 Elev. 1784.8 8/24 to 8/31/71 JI

0.0 1.0 TOPSOIL and ROOTS with BOULDERS.

1.0 9.0 SAND, silty with gravel, cobbles and boulders, about 35% fines, 15% fine sand, 15% medium sand, 25% coarse sand, 10% gravel, sub-angular, hard to partially weathered, 2-inch maximum size, olive-brown, damp, low permeability, dense, GLACIAL TILL.

9.0 19.0 BEDROCK, dark gray, hard, feldspar-quartz-biotite gneiss with thin veinlets of granite. Foliation sub-horizontal to dipping 30°. Generally moderately fractured with a few highly fractured zones. Fractures, rusty weathered, horizontally to dipping 60°, spaced 2 to 9-inches apart, except in highly fractured intervals.

19.0 Bottom of Hole.

Drive Samples

No.	Depth	Blo./ft.	% Recovery
1.	5.0 - 6.5	78	75
2.	6.5 - 8.0	98	100

Rock Core Runs

No.	Depth	% Recovery
1.	9.0 - 11.0	90
2.	11.0 - 19.0	90

NOTE: Water level at 2.0 feet on 8/23/71.

DH-601 Elev. 1788.2 8/25 to 8/26/71 DBH

0.0 1.0 TOPSOIL.

1.0 22.0 SAND, silty with gravel, about 40% fines, 15% fine sand, 15% medium sand, 5% coarse sand, 10% gravel, sub-angular, 3/4-inch maximum size, olive-brown, damp, low permeability, dense, GLACIAL TILL.

22.0 Bottom of Hole.

Drive Samples

No.	Depth	Blo./ft.	% Recovery
1.	0.0 - 1.5	6	100
2.	1.5 - 3.0	31	100
3.	3.0 - 4.5	16	100
4.	4.5 - 6.0	40	100
5.	10.0 - 11.5	75	90
6.	15.0 - 16.5	137	90
7.	20.0 - 21.0	182/1" ref.	90

NOTE: Water level at 6.3 feet on 8/26/71. Drill Water

TEST PITS

TP-1 Elev. 1799.1 10/30/69 DBH

0.0 1.0 TOPSOIL.

1.0 11.0 SAND, silty with cobbles and boulders, about 35% fines, 20% fine sand, 20% medium sand, 15% coarse sand, 10% gravel, angular, 3" maximum size, brown to olive, damp, low permeability, very dense, GLACIAL TILL weathered to about 3 feet. Est. 40% cobbles and boulders.

11.0 Bottom of Pit.

Note: Sample 1.1 -- 3' to 11.0'.

TP-2 Elev. 1787.0 11/2/69 DBH

0.0 1.0 TOPSOIL.

1.0 12.0 SAND, silty with cobbles and boulders, about 15% fines, 12% fine sand, 17% medium sand, 19% coarse sand, 12% gravel, angular, 1-liter maximum size, brown to olive, damp, low permeability, very dense, GLACIAL TILL weathered to 3 feet, about 20% cobbles and boulders.

12.0 Bottom of Pit.

Note: Sample 2.1 -- 3' to 12.0'.

TP-3 Elev. 1773.7 11/2/69 DBH

0.0 3.0 ORGANIC SANT, and gravel with about 35 fines, 1 % fine sand, 2 % medium sand, 3.5 coarse sand, 25% gravel, 12% cobbles, black, wet, medium permeability, loose.

3.0 12.0 SAND, silty with gravel and cobbles, about 20% fines, 15% fine sand, 17% medium sand, 15% coarse sand, 3.5 gravel, 11 cobbles, angular, 1-foot maximum size, brown to olive, damp, low permeability, very dense, GLACIAL TILL. Est. 2'6 - 0".

12.0 Bottom of Pit.

Note: No Sample -- Same as No. 1.

TP-4 Elev. 1788.5 11/2/69 DBH

0.0 1.0 TOPSOIL.

1.0 12.0 SAND, silty with cobbles and boulders, about 22% fines, 12% fine sand, 13% medium sand, 18% coarse sand, 35% gravel, 3% cobbles, angular, 12-inch maximum size, brown to olive brown, damp, low permeability, very dense, GLACIAL TILL. Est. 3'6 - 0".

TP-4 Cont'd Elev. 1788.5 11/2/69 DBH

12.0 Bottom of Pit.

Note: No Sample -- Same as TP-3.1

TP-5 Elev. 1791.5 11/2/69 DBH

0.0 7.0 COBBLES AND BOULDERS mantled with 6% Matrix slightly organic.

7.0 9.0 SAND, silty with gravel and cobbles, about 20% fines, 12% fine sand, 8% medium sand, 15% coarse sand, 35% gravel, 5% cobbles, sub-angular, or 6-inch maximum size, olive, damp, low permeability, dense, GLACIAL TILL. est. 35% + 6".

9.0 Bottom of Pit.

Note: No sample -- Same as TP-3.1.

TP-6 Elev. 1788.0 11/2/69 DBH

0.0 1.0 TOPSOIL.

1.0 12.0 SAND, silty with gravel, cobbles and boulders, about 40% fines, 12% fine sand, 13% medium sand, 10% coarse sand, 3.5 gravel, 5% cobbles, angular, 12-inch maximum size, olive, damp, low permeability, dense, GLACIAL TILL. est. 35% + 6".

12.0 Bottom of Pit.

Note: Sample TP-6.1 -- 3' to 12.0'.

TP-7 Elev. 1791.8 11/2/69 DBH

0.0 1.0 TOPSOIL.

1.0 12.0 SAND, silty with gravel, cobbles and boulders, about 35% fines, 2% fine sand, 15% medium sand, 10% coarse sand, 25% gravel, sub-angular, 2-inch maximum size, olive, damp, low permeability, dense, GLACIAL TILL. Estimated 30% + 6".

12.0 Bottom of Pit.

Note: Sample TP-7.1 -- 3' to 12.0'.

TP-8 Elev. 1789.0 9/16/71 DBH

0.0 1.5 TOPSOIL and ROOT.

1.5 10.0 SAND, silty with gravel, and cobbles, about 40% fines, 15% fine sand, 15% medium sand, 2.5 coarse sand, 10% gravel, sub-angular, 6-inch maximum size, olive-brown, moist, low permeability, dense, GLACIAL TILL.

10.0 Bottom of Pit.

Sample TP-8.1 -- 2 to 10 feet.

TP-9 Elev. 1789.9 9/16/71 DBH

0.0 0.5 TOPSOIL.

0.5 10.0 SAND, silty with gravel and cobbles, about 40% fines, 17% fine sand, 15% medium sand, 2.5 coarse sand, 10% gravel, sub-angular, 1-liter maximum size, olive-brown, moist, low permeability, dense, GLACIAL TILL.

10.0 Bottom of Pit.

No Sample.

TP-10 Elev. 1789.6 9/16/71 DBH

0.0 0.5 TOPSOIL.

0.5 10.0 SAND, silty with gravel, about 40% fines, 15% fine sand, 15% medium sand, 2.5 coarse sand, 10% gravel, sub-angular, 12-inch maximum size, olive-brown, moist, low permeability, dense, GLACIAL TILL.

10.0 Bottom of Pit.

Sample TP-10.1 -- 2 to 10 feet.

TP-11 Elev. 1793.8 9/16/71 DBH

0.0 1.5 TOPSOIL and ROOT.

1.5 10.0 SAND, silty with gravel and cobbles, about 40% fines, 15% fine sand, 15% medium sand, 2.5 coarse sand, 10% gravel, sub-angular, 12-inch maximum size, olive-brown, moist, low permeability, dense, GLACIAL TILL.

10.0 Bottom of Pit.

Sample No. TP-11.1 -- 2 to 10 feet.

TP-12 Elev. 1790.7 9/16/71 DBH

0.0 1.5 TOPSOIL.

1.5 9.0 SAND, silty with gravel and cobbles, about 40% fines, 15% fine sand, 15% medium sand, 2.5 coarse sand, 10% gravel, sub-angular, 12-inch maximum size, olive-brown, moist, low permeability, dense, GLACIAL TILL.

9.0 Bottom of Pit

Sample No. TP-12.1 -- 2 to 9 feet.

WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT
WASHINGTON MOUNTAIN LAKE MULTIPLE-PURPOSE DAM
OCTOBER MOUNTAIN STATE FOREST, MASSACHUSETTS

LOGS OF TEST HOLES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

MA-36[illegible] P

...Mountain Brook
Site 3
...Massachusetts
Berkshire County

DH-1 Elev. 177.0 12/5 to 12/7/70 DBM

0.0 6.0 SAND, some silt and organic, about 5% fines, 15% fine sand, ~5% medium sand, 5% coarse sand, 10% gravel, sub-angular, ½-inch maximum size, grey-black, wet, medium permeability, dense, VALLEY FILL. SM

6.0 15.0 SAND, some silt, about 2% fines, 8% fine sand, 30% medium sand, grey, wet, low permeability, dense, VALLEY FILL. SM

15.0 23.5 BEDROCK, dark grey, biotite hornblende granitic gneiss, moderately to highly fractured in top 5 feet, most fractures dipping about 65°, some horizontal fractures tight.

23.5 Bottom of Hole.

Drive Samples

No.	Depth	Blo./Ft.	% Recovery
1.	0.0 - 1.5'	31	50
2.	3.5 - 5.0'	72	35
3.	5.5 - 8.0'	26	90
4.	9.5 - 11.0'	86	50

Permeability Test

No.	Depth	Hole Size	Pipe Stick up	Pipe Loss
1.	5.0'	3"	Ground	None
2.	10.0'	3"	Ground	None
3.	15.0'	3"	Ground	Slight

Rock Core Runs

No.	Depth	% Recovery
1.	15.0 - 18.5'	75
2.	18.5 - 23.5'	90

NOTE: Water flowing at 19.0 feet 12/5/70. Flow 1 gpm/minute

DH-2 Elev. 179.5 12/8 to 12/9/70 DBM

0.0 11.5 SAND, silty with gravel, about 3% fines, 2% fine sand, 15% medium sand, 15% coarse sand, 15% gravel, 5% cobbles, sub-angular, 8-inch maximum size, olive, damp, low permeability, dense, GLACIAL TILL. SM

11.5 24.5 BEDROCK, dark grey-biotite hornblende granitic gneiss, highly fractured, in top 3 feet, then moderately fractured with most fractures dipping about 65°, some horizontal fractures. Slight water below 14.5 feet.

24.5 Bottom of Hole

Drive Samples

No.	Depth	Blo./Ft.	% Recovery
1.	0.0 - 1.5'	27	70
2.	7.5 - 9.0'	32	60

Permeability Test

No.	Depth	Hole Size	Pipe Stick Up	Pipe Loss
1.	5.0'	3"	Ground	1½ gal./min. plus
2.	10.5'	3"	Ground	1½ gal./min. plus

Rock Core Runs

No.	Depth	% Recovery
1.	10.5 - 14.5'	80
2.	14.5 - 24.5'	95

NOTE: Lost circulation at 3 feet in boulders Regained circulation at 6.5 feet, lost circulation at 10.5 feet.

DH-3 Elev. [illegible] 10/17 to 10/21/70 DBM

0.0 [illegible] SAND, silty with gravel and boulders, about 3% fines, 2% fine sand, 15% medium sand, 2% coarse sand, 10% gravel, angular, 2 feet maximum size, grey-green, damp, low permeability, very dense, GLACIAL TILL. SM

[illegible] [illegible] BEDROCK, dark grey, biotite hornblende granitic gneiss, moderately fractured, fractures spaced 12 to 15-inches apart. Most fractures horizontal, one dipping about 65°, fractures tight.

[illegible] Bottom of Hole. 1 foot topsoil removed.

Drive Samples

No.	Depth	Blo./Ft.	% Recovery
1.	0.0 - 1.5'	14	70
2.	3.5 - 5.0'	60	70
3.	5.0 - 6.5'	50 ft. ref.	50

Permeability Test

No.	Depth	Hole Size	Pipe Stick Up	Pipe Loss
1.	5.0'	3"	Ground	None

Rock Core Runs

No.	Depth	% Recovery
1.	3.0 - 3.0'	0%
2.	6.8 - 13.0'	10%
3.	13.0 - 15.0'	10%

NOTE: Water level dry at 7/31/70.

DH-4 Elev. 1781.6 10/15 to 10/15/70 DBM

0.0 5.5 TOPSOIL and BOULDERS with a silty sand matrix.

5.5 19.0 SAND, silty, about 35% fines, 2% fine sand, 15% medium sand, 20% coarse sand, 10% gravel, angular, 2-inch maximum size, olive-brown, SM damp, low permeability, very dense, GLACIAL TILL.

19.0 21.0 BEDROCK, dark grey, biotite hornblende, granitic gneiss, moderately fractured, fractures horizontal, tight.

21.0 Bottom of Hole.

Drive Samples

No.	Depth	Blo./Ft.	% Recovery
1.	6.0 - 7.5'	102	80
2.	11.0 -12.5'	39	70

Permeability Test

No.	Depth	Hole Size	Pipe Stick Up	Pipe Loss
1.	5.5'	3"	Ground	12 gal/min.
2.	10.0'	3"	Ground	None

Rock Core Runs

No.	Depth	% Recovery
1.	15.5 - 21.0'	75%

NOTE: Water level at 5.5 feet on 10/15/70.

DH-5 Elev. 1790.1 10/15 to 10/16/70 DBM

0.0 7.0 SAND, silty with gravel, about 3% fines, 20% fine sand, 15% medium sand, 2% coarse sand, 10% gravel, angular, ½-inch maximum size, olive, damp, low permeability, dense, GLACIAL TILL. SM

7.0 18.0 BEDROCK, dark grey, biotite, hornblende gneiss, moderately fractured, fractures spaced 4-inches to 12-inches apart, most fractures horizontal, some dipping about 60°, fractures are tight, rock hard, but slightly weathered in top 3 feet.

18.0 Bottom of Hole.

Drive Samples

No.	Depth	Blo./Ft.	% Recovery
1.	0.0 - 1.5'	36	[illegible]
2.	1.5 - 3.0'	54	[illegible]

Rock Core Runs

No.	Depth	% Recovery
1.	7.0 - 10.0'	75
2.	10.0 - 15.0'	75
3.	15.0 - 18.5'	100

NOTE: Water level 3.5 feet on [illegible]/7...

DH-6 Elev. 1777.6 8/16 to 8/18/71 DBM

0.0 1.0 TOPSOIL and ROOT MAT.

1.0 8.7 SAND, silty with gravel, about 35% fines, 15% fine sand, 15% medium sand, 25% coarse sand, 10% grave, sub-angular, 6-inch maximum size, olive-brown, damp, low permeability, dense to very dense, GLACIAL TILL. SM

8.7 18.7 BEDROCK, grey quartz, biotite, hornblende granitic gneiss, moderately fractured to 9.0 feet, fractures horizontal, one dipping about 70° them slightly fractured, fractures 6 to 20-inches apart, and horizontal, hard all fractures tight

18.7 Bottom of Hole.

Drive Samples

No.	Depth	Blo./Ft.	% Recovery
1.	0.0 - 1.5'	5	[illegible]
2.	1.5 - 3.0'	35	[illegible]
3.	5.0 - 6.5'	57	[illegible]
4.	8.0 - 8.7'	3.0/.7 ref.	[illegible]

Permeability Test

No.	Depth	Hole Size	Head	Loss
1.	8.7'	3"	Ground	Tight

Rock Core Runs

No.	Depth	% Recovery
1.	8.7 - 9.1...	[illegible]
2.	11.0 - 15.5'	[illegible]
3.	15.5 - 20.7'	[illegible]

Sand Pressured Test, but could not seal casing.

NOTE: water level at 5.0 feet on [illegible]/71.

DH-7 Elev. 1780.1 8/19 to 8/...71 ...

0.0 [illegible] TOPSOIL and ROOT MAT.

1.0 15.0 SAND, silty, micaceous with boulders and cobbles, about 15% fines, 15% fine sand, 15% medium sand, 25% coarse sand, [illegible] gravel, sub-angular, 3% [illegible] 6-inch maximum size, olive-brown, damp, low permeability, dense, GLACIAL TILL. SM

15.0 25.0 Boulder
BEDROCK, light grey, hard, slightly to weakly foliated, feldspar-quartz-biotite gneiss with foliation dipping about [illegible] fractures mostly subhorizontal, [illegible] fractured and rusty weathered, generally spaced 4-inches to 12-inches apart, [illegible] fractures and weathered, zones between 15.0 and 18.0 feet.

25.0 Bottom of Hole.

Drive Samples

No.	Depth	Blo./Ft.	% Recovery
1.	0.0 - 1.5'	[illegible]	[illegible]
2.	1.5 - 3.0'	53	[illegible]
3.	7.5 - [illegible]	[illegible]	[illegible]
4.	13.0 -14.5'	6	[illegible]

Rock Core Runs

No.	Depth	% Recovery
1.	18.0 - 18.0'	100
2.	18.0 - 23.0'	95
3.	23.0 - 25.0'	100

Pressure Tests

No.	Depth	Hole Size	Psi	Loss
1.	15.5 - 25.0'	3"	[illegible] psi	[illegible] gal./min.

NOTE: Water level at 5.5 feet on 8/24/71.

DH-8 Elev. 1784.6 8/23 to 8/26/71 DBM

0.0 1.0 TOPSOIL and BOULDERS.

1.0 9.0 SAND, silty with gravel, cobbles, about 35% fines, 15% fine sand, 15% medium sand, 25% coarse sand, 10% gravel, sub-rounded, 8-inch maximum size, olive-brown, damp, low permeability, dense to very dense, GLACIAL TILL. SM

9.0 2...0 BEDROCK, grey, biotite hornblende, feldspar gneiss, highly fractured to 15 feet, then moderately fractured fractures spaced ½ to 3-inches from 9 to 16 feet then 8 to 12" hard with quartz leaders, most fractures nearly vertical, but some dipping about 65° Foliation dipping about 5...

2...0 Bottom of Hole.

Drive Samples

No.	Depth	Blo./Ft.	% Recovery
1.	0.0 - 1.5'	3/12/1 ref.	[illegible]
2.	2.5 - 3.5'	50/1" ref.	[illegible]
3.	5.5 - 7.5'	73	[illegible]

Rock Core Runs

No.	Depth	% Recovery
1.	9.0 - 11.0'	[illegible]
2.	11.0 - 15.5'	90
3.	19.0 - 2...0'	100

Permeability Test

No.	Depth	Hole Size	Head	Loss
1.	9.0 - 21.5'	3"	[illegible]	19 gal./min.

NOTE: Lost drilling water at 11.5 ft. Water level at 11.5' on 8/24/71.

DH-9 Elev. 1801.2 8/2... to 8/25/71 ...BM

0.0 1.0 TOPSOIL and ROOT MAT.

1.0 7.0 SAND, silty with gravel, about 35% fines, 15% fine sand, 15% medium sand, 25% coarse sand, 15% gravel, sub-angular, 6-inch maximum size, olive-brown, damp, low permeability, dense to very dense, GLACIAL TILL. SM

7.0 1...0 BEDROCK, grey, biotite, hornblende, quartz gneiss, moderately fractured. Fractures 3 to 18-inches apart. Most fractures horizontal, 3 fractures dipping about 60°. Foliation not well defined. Soft to hard.

1...0 Bottom of Hole.

Drive Samples

No.	Depth	Blo./Ft.	% Recovery
1.	0.0 - 1.5'	5[illegible]	[illegible]
2.	1.5 - 3.0'	5[illegible]	[illegible]
3.	4.5 - 6.0'	[illegible]	[illegible]

Rock Core Runs

No.	Depth	% Recovery
1.	7... - 1...5'	[illegible]
2.	2...5 - 1...0'	75

NOTE: Water level at 6.9 feet on 8/25/71. Probably drill water.

DH-2... Elev. 1...2.0 8/19 to 8/...71 ...

0.0 1... TOPSOIL and ROOT...

1... 6... SAND, silty with gravel, and cobbles, about 3[illegible] fines, 1[illegible] fine sand, 1[illegible] medium sand, 2[illegible] coarse sand, ...% grave... sub-angular, 6-inch maximum size, olive-brown, damp, low permeability, dense, GLACIAL TILL.

6... 1...0 BEDROCK, grey, hard, feldspar-quartz, biotite gneiss with foliation dipping about 1[illegible] fractures are horizontal to dipping 7..., spaced 2 to 3-inches apart, and are weathered rusty. From 11... to ... feet, fractures are horizontal, spaced 2 to 3-inches apart, and also rusty weathered.

1...0 Bottom of Hole.

Drive Samples

No.	Depth	Blo./Ft.	% Recovery
1.	0.0 - 1.5'	[illegible]	[illegible]
2.	1.5 - 3.5'	9[illegible]/1" re...	[illegible]
3.	4.5 - 6.5'	1[illegible]	[illegible]
4.	7.5 - 7.5'	[illegible]/3.0" ref.	[illegible]

DH-2[illegible] Cont'd

Rock Core Runs

No.	Depth	% Recovery
4.	8[illegible] - 12'	[illegible]
5.	[illegible] - 16[illegible]	[illegible]
6.	16[illegible] - 18'	[illegible]

NOTE: Water level at [illegible] feet on 8/[illegible]/71.

DH-2... Elev. 1[illegible] 8/25 to 8/[illegible]/71 ...

0.0 1.0 TOPSOIL and ROOTS.

1.0 10.6 SAND, silty with boulders about 35% fines, 15% fine sand, 15% medium sand, 25% coarse sand, 10% gravel, sub-angular, 12-inch maximum size, olive-brown, damp, low permeability, dense, GLACIAL TILL.

10.6 22.0 BEDROCK, grey, hard, feldspar-quartz-biotite-garnet gneiss with foliation dipping 5° highly fractured between 10.6 to 21.0 feet, more solid from 21.0 to 22 feet. Fractures rusty stained, horizontal to vertical, spaced [illegible] inches to 12-inches apart, very badly fractured and weathered from 10.6 to 11.0 feet and [illegible] to 17... feet.

22.0 Bottom of Hole.

Drive Samples

No.	Depth	Blo./Ft.	% Recovery
1.	[illegible]	[illegible]	[illegible]
2.	[illegible]	[illegible]	[illegible]
3.	[illegible]	[illegible]	[illegible]
4.	[illegible]	[illegible]	[illegible]

Rock Core Runs

No.	Depth	% Recovery
1.	10.5 - 12.0'	[illegible]
2.	12.0 - 15.5'	[illegible]
3.	15.5 - 20.0'	[illegible]
4.	20.0 - 22.0'	[illegible]

NOTE: Dry hole on 8/25/71. (Lost water at 10... feet

DH-2... Elev. 1[illegible] 8/26 to 8/27/71 ...BM

0.0 [illegible] TOPSOIL and ROOT MAT.

[illegible] [illegible] SAND, silty with gravel, about 35% fines, 15% fine sand, 15% medium sand, 25% coarse sand, 10% gravel, sub-angular, 6-inch maximum size, olive-brown, damp, low permeability, dense to very dense, GLACIAL TILL.

[illegible] [illegible] BEDROCK, grey, quartz, biotite, hornblende granitic gneiss highly fractured from 7... to 15... feet, fractures are horizontal to 2-inches apart, horizontal, and dipping about 5... moderately fractured with horizontal fractures hard.

2[illegible] Bottom of Hole

Drive Samples

No.	Depth	Blo./Ft.	% Recovery
1.	[illegible]	[illegible]	[illegible]
2.	[illegible]	[illegible]	[illegible]

Rock Core Runs

No.	Depth	% Recovery
1.	7.0 - 12...	[illegible]
2.	12... - 15...	[illegible]
3.	15... - 20...	[illegible]
4.	20... - 25...	[illegible]

NOTE: water level at [illegible]/71

DH-2... Elev. [illegible] 8/2... to 8/25/71 ...BM

0.0 [illegible] TOPSOIL AND ROOT MAT.

[illegible] 7.5 SAND, silty with grave... and... 35% fines, 15% fine sand, ... medium sand, 25% coarse sand, 1[illegible] grave... sub-angular, [illegible] inches maximum size, olive-brown, damp, low permeability, dense to very dense, GLACIAL TILL.

7.5 [illegible] BEDROCK, grey, biotite, hornblende quartz gneiss, weathered and highly fractures from 7... to [illegible] very moderately fractured, fractures spaced from 3-inch to 12-inches apart, mostly horizontal with some fractures dipping about 5[illegible] and/or east

WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT
WASHINGTON MOUNTAIN LAKE MULTIPLE-PURPOSE DAM
OCTOBER MOUNTAIN STATE FOREST, MASSACHUSETTS

LOGS OF TEST HOLES

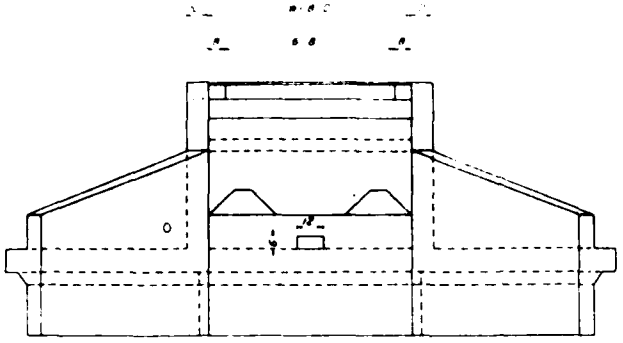
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

[illegible] D. W. [illegible]
[illegible] W. [illegible] 8-7-7...

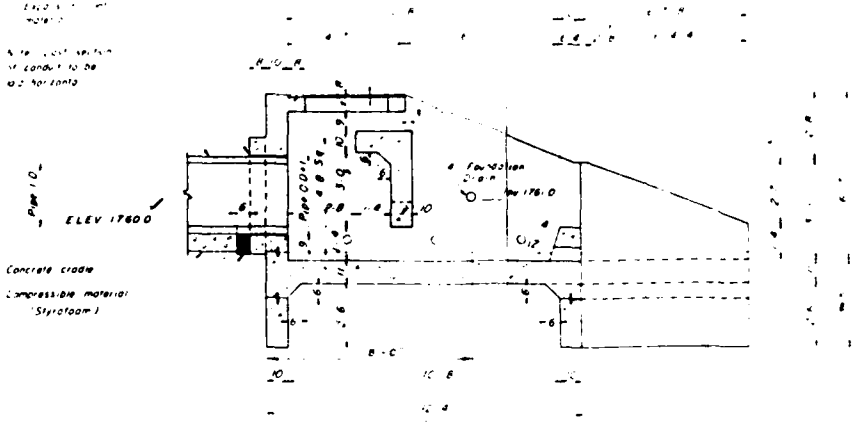
MA-36: P

B-2

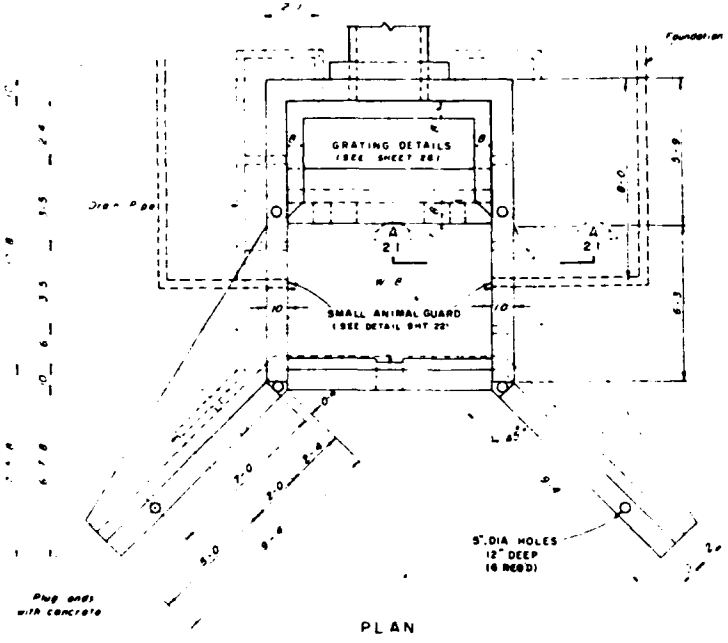
...PROPERTY OF GOVERNMENT OF MASS...



DOWNSTREAM ELEVATION

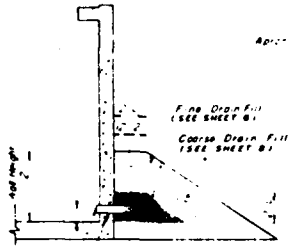


SECTION ON CENTERLINE



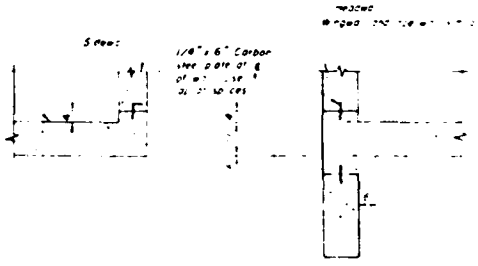
PLAN

SECTION (2/1)



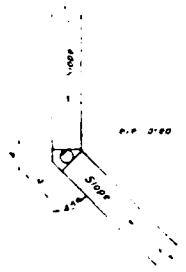
SECTION THROUGH DRAIN & FILTER

NOT TO SCALE



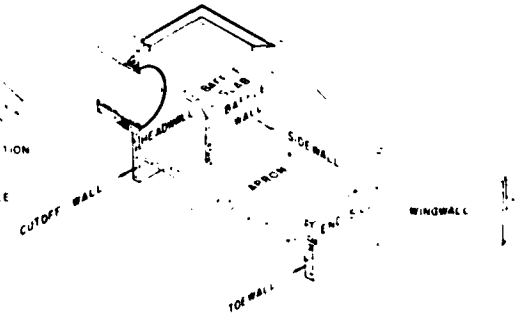
CONSTRUCTION JOINT DETAILS

NOT TO SCALE



PLAN - JUNCTION SIDEWALL AND WINGWALL

NOT TO SCALE



ISOMETRIC VIEW

QUANTITIES

Formwork (contact area)	
Reinforcing steel	28.4
Excavation	
Backfill	
Corrugated metal pipe	
Animal screen detail	sheet 2 of 5
Drain pipe (4")	
Drain pipe (6")	
Drain pipe (45° B.)	
Coarse Drain Fill	
Fine Drain Fill	
Concrete	
1/8" x 6" Carbon steel plate, Structural grade 50	

STANDARD IMPACT BASIN	
DESIGN CONSTANTS: f'_c = psi	f_y = 60,000 psi
n = 8	f_s = 20,000 psi
STANDARD DRAWING NO.	ES-4080
DATE	SHEET 1 OF 5

CARL ROHDE
Consulting Engineer
654 Ridgeway Rd Lake Oswego, Ore

SCALE IN FEET EXCEPT AS NOTED

WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT
WASHINGTON MOUNTAIN LAKE MULTIPLE-PURPOSE DAM
OCTOBER MOUNTAIN STATE FOREST, MASSACHUSETTS

IMPACT BASIN DETAILS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed J.A. TIBBETTS
Drawn P.W. WILDA
Traced
Checked
Approved
Area Engr.
S.C.S. Bureau
C.E. Dodge

MA-361 P

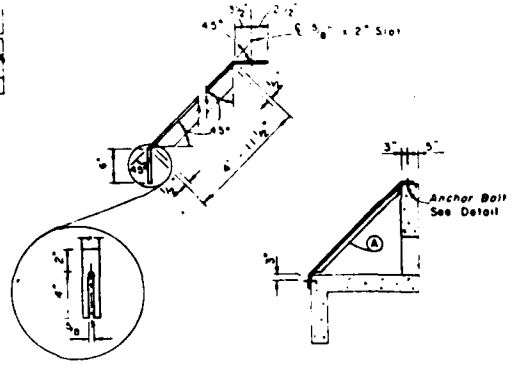
B-2

RESERVOIR DRAIN TRASH RACK BILL OF MATERIALS

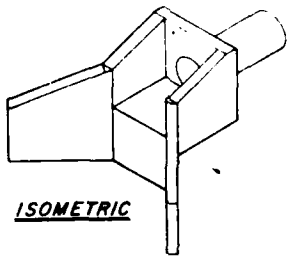
Item	Size	Length	Quan
Angle Ⓒ	2½" x 2½" x ½"	5'-2"	2
Anchor Bolt	½" Dia	2'-8"	4

CONSTRUCTION DETAILS

1. Material in reservoir drain trash rack shall conform to Spec 581 for structural steel
2. Trash rack to be galvanized in accordance with Spec 582

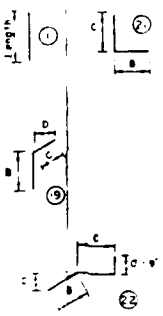


TRASH RACK



ISOMETRIC

BAR TYPES



RESERVOIR DRAIN STEEL SCHEDULE

Mark	Quan	Size	Length	Type	B	C	D	Total Length
	5	4	5'-9"	2	2'-2"	3'-4"		
	4	4	9'-5"	9	6'-8"	2'-9"	2'-4"	17'-6"
3	2	4	8'-0"	9	6'-8"	2'-4"	0'-8"	16"
4	2	4	8'-8"	22	4'-9"	3'-6"		8'-6"
5	2	4	5'-10"	22	3'-3"	3'-6"	0'-6"	11"
6	2	4	2'-11"	21	2'-2"	0'-9"		5'-8"
7	2	4	11'-11"	22	7'-2"	4'-0"	3'-7"	23'-8"
8	4	4	2'-9"	1				11'-0"
9	4	4	3'-3"	1				13'-0"
10	4	4	3'-9"	1				15'-0"
11	2	4	4'-6"	1				9'-0"
12	4	4	5'-5"	21	2'-9"	2'-8"		21'-8"
13	4	4	6'-0"	21	2'-9"	3'-3"		24'-0"
14	4	4	5'-0"	21	2'-9"	2'-3"		20'-0"
15	3	4	3'-6"	1				10'-6"

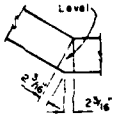
QUANTITIES (This Sheet Only)

STEEL

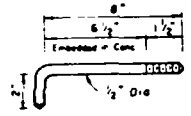
No. 4 Bar 266.6 ± 28 Lbs

CONCRETE

Class 4000 3.0 Cu Yds Reinforced

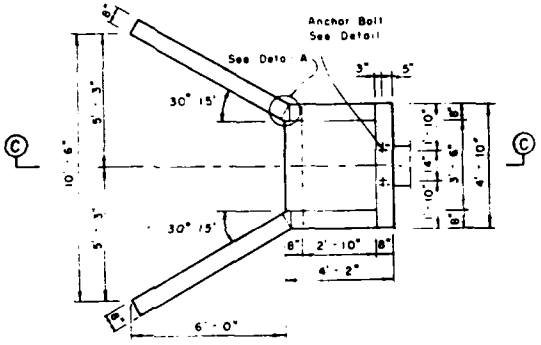


DETAIL A

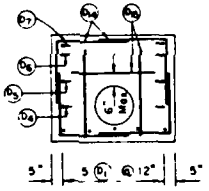


ANCHOR BOLT

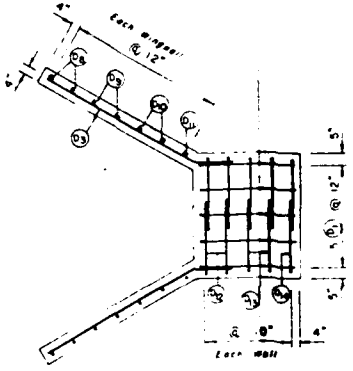
ASTM A-276, ⅞" Dia
Class 302 or 303
With Type 2 nuts and washers



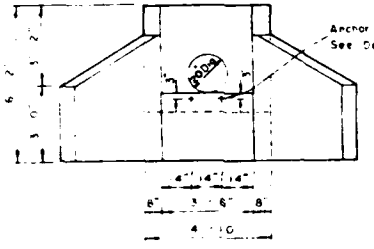
PLAN



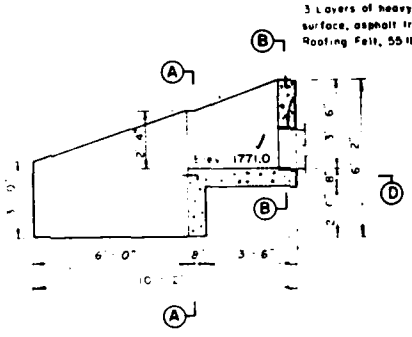
SECTION BB



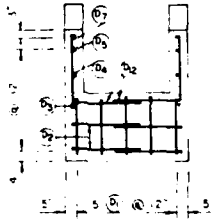
SECTION DD



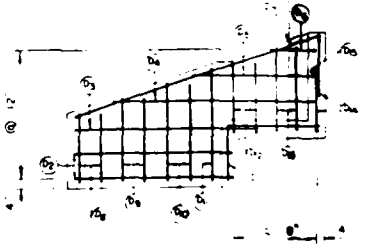
UPSTREAM ELEVATION



SECTION ALONG CENTERLINE



SECTION A A



SECTION C C

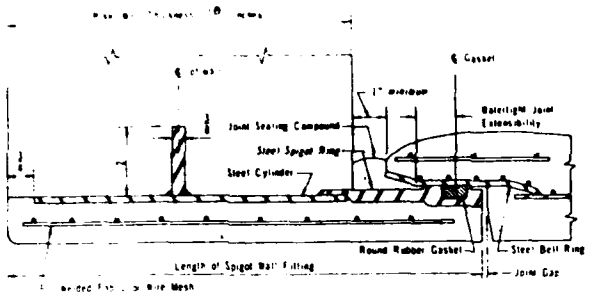
REINF CONCRETE RESERVOIR DRAIN INLET
(CLASS 4000 CONC)

WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT
WASHINGTON MOUNTAIN LAKE MULTIPLE-PURPOSE DAM
OCTOBER MOUNTAIN STATE FOREST, MASSACHUSETTS

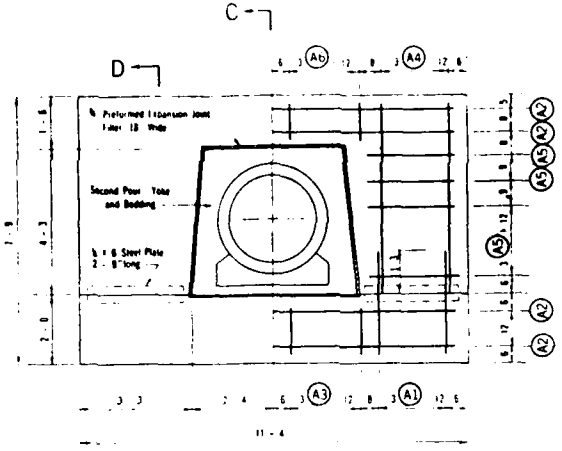
RESERVOIR DRAIN INLET DETAILS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

MA-361-P

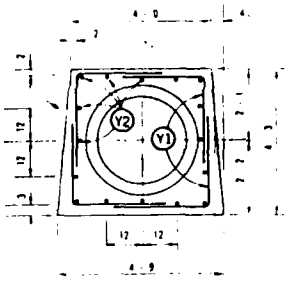
BY PRODUCED AT GOVERNMENT EXPENSE



DETAIL A

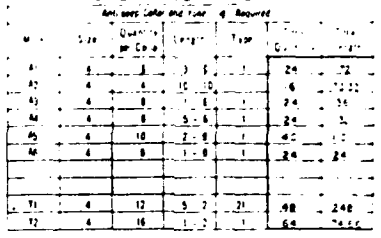


DETAIL OF ANTI-SEEP COLLAR

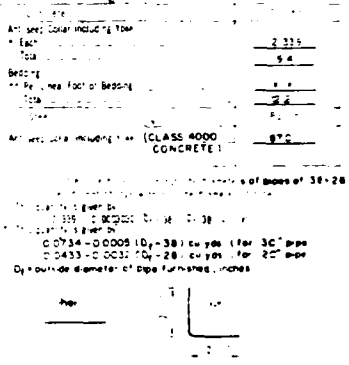


DETAIL OF ANTI-SEEP COLLAR YOKE

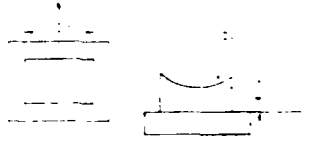
STEEL SCHEDULE



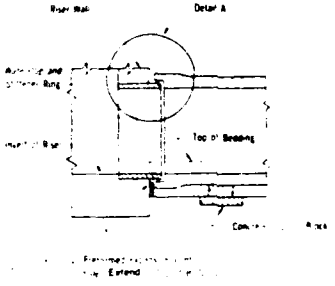
QUANTITIES



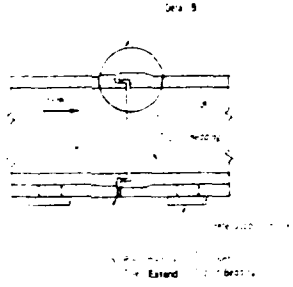
BAR TYPES



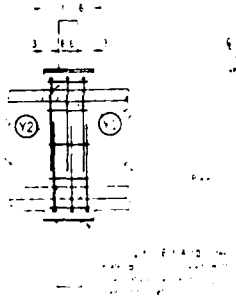
SUGGESTED SUPPORT BLOCKS



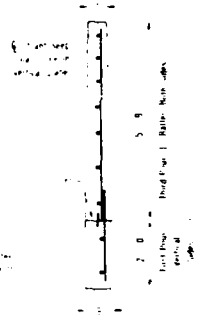
DETAIL OF SPIGOT WALL FITTING



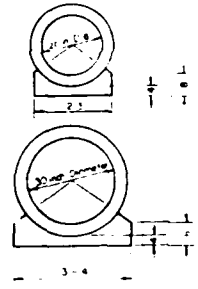
DETAIL OF PIPE JOINT



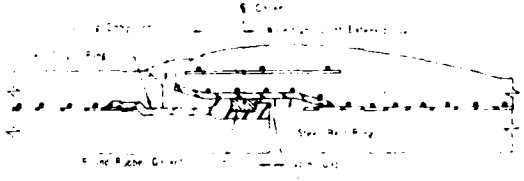
SECTION C-C



SECTION D-D

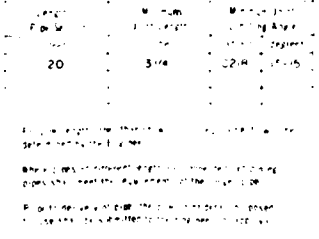


DETAIL OF BEDDING

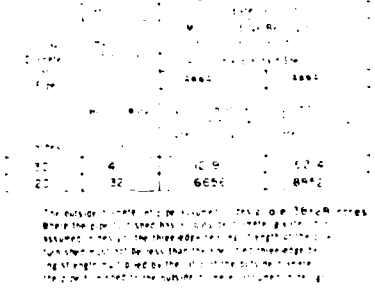


DETAIL B

JOINT REQUIREMENTS



STRENGTH REQUIREMENTS



STANDARD CONDUIT DETAILS	
FOR REINFORCED CONCRETE PRESSURE PIPE PRINCIPAL SPILLWAY	
STANDARD DRG NO.	MS 5030-BE
DATE 2-70	SHEET 1 OF 1

Joint length equals watertight joint gasket to joint gap

The pipe shall be drawn together so that the maximum joint gap does not exceed 1 inch for pipe 12 inches and smaller. For 15 inch and larger pipe the joint may be deflected a maximum of 1 inch per 12 inches of pipe length. For curved line the joint gap at the closest point shall not exceed 1 inch.

WASHINGTON MOUNTAIN BROOK WATERSHED PROJECT
WASHINGTON MOUNTAIN LAKE MULTIPLE-PURPOSE DAM
OCTOBER MOUNTAIN STATE FOREST, MASSACHUSETTS

CONDUIT DETAILS

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

ACCEPTED — Date — Approved by

Designed — A TIBBETTS — 6-70 — Title

Traced — Title

Checked — Title

Scale — Sheet No. MA - 36 P

REPRODUCED AT GOVERNMENT EXPENSE

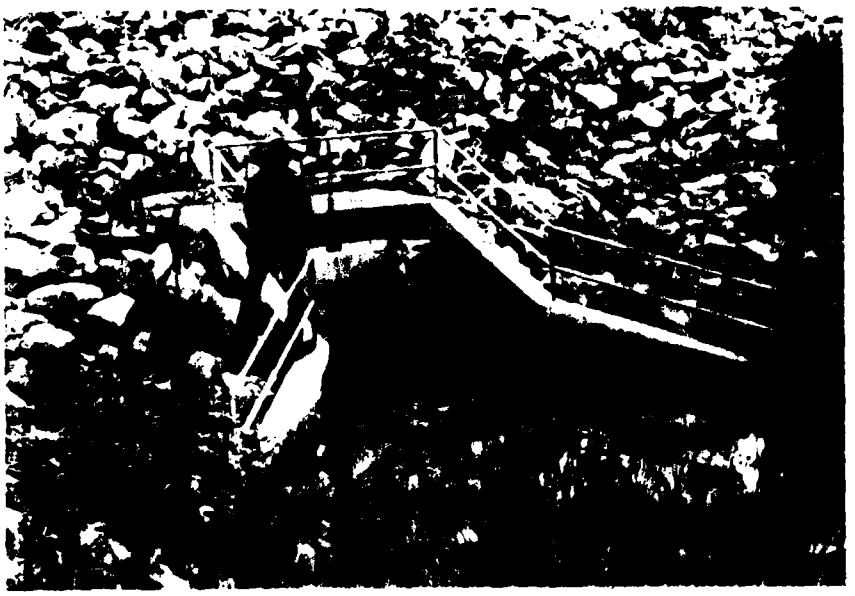
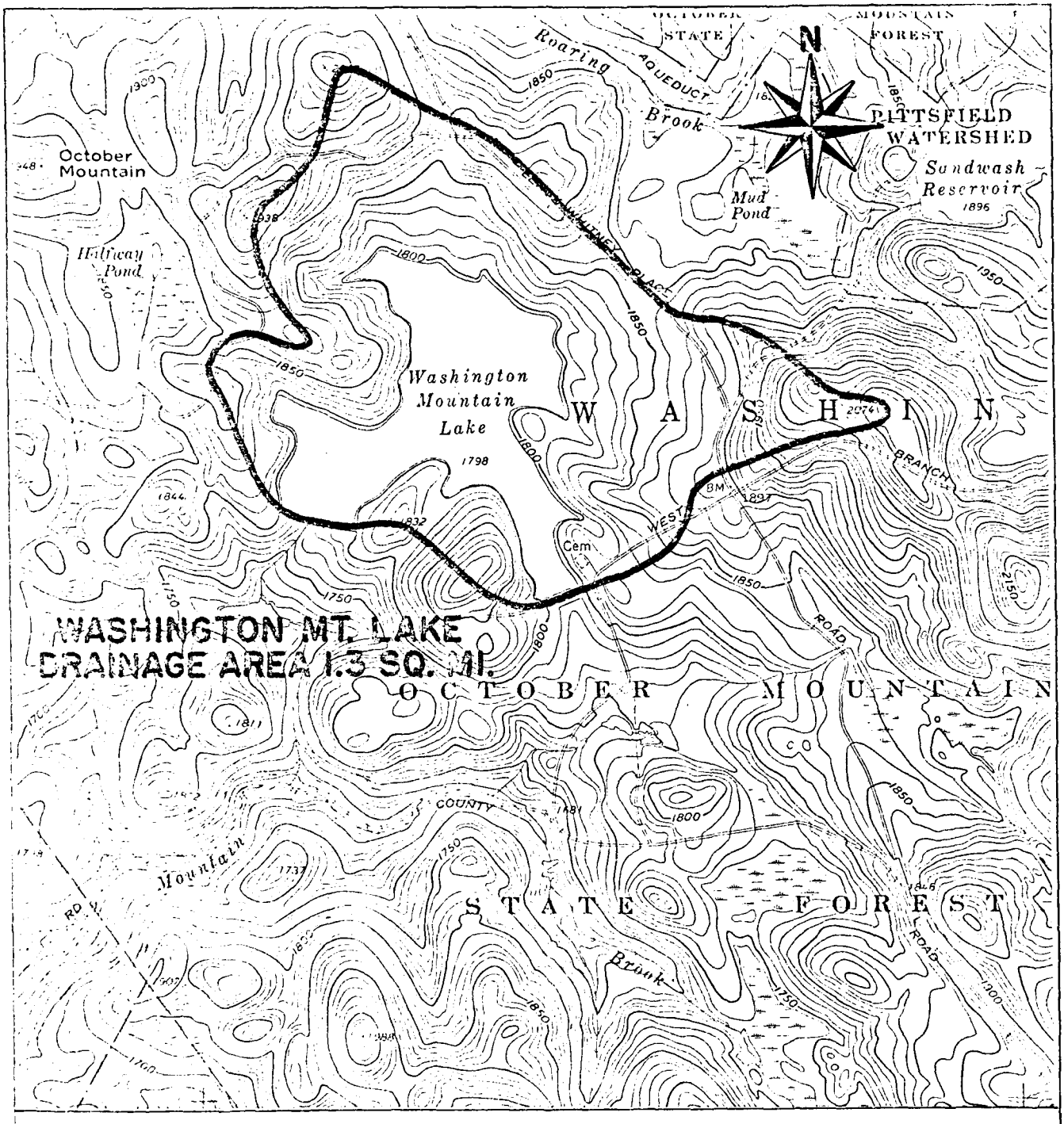


Photo 13 - View of impact basin structure looking northeasterly from downstream.

APPENDIX D

APPENDIX D

OUTLINE OF DRAINAGE AREA AND HYDRAULIC COMPUTATIONS



-SCALE-
1000' 0 1000' 2000' 3000'

FROM: USGS EAST LEE, MASS.
QUADRANGLE MAP

TIGHE & BOND / SCI CONSULTING ENGINEERS EASTHAMPTON, MASS.	U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

DRAINAGE AREA MAP

WASHINGTON MOUNTAIN LAKE DAM (MA 318)
BERKSHIRE COUNTY MASSACHUSETTS

			SCALE: AS NOTED
			DATE: DECEMBER 1979

Hydrologic/Hydraulic Computations by D. Lenore

December 3, 1979 Computations Checked by: Moe 1 of 7

Washington Mountain Lake Dam

Drainage Area = 832 Acres = 1.3 Square Miles

Water Surface = 224 Acres

Size Classification

Height of Dam = 44 Feet (Intermediate)

Storage (at spillway crest) = 3910 Acre-Feet (Intermediate)

∴ Use Intermediate

Hazard Potential = High

Test Flood = PMF

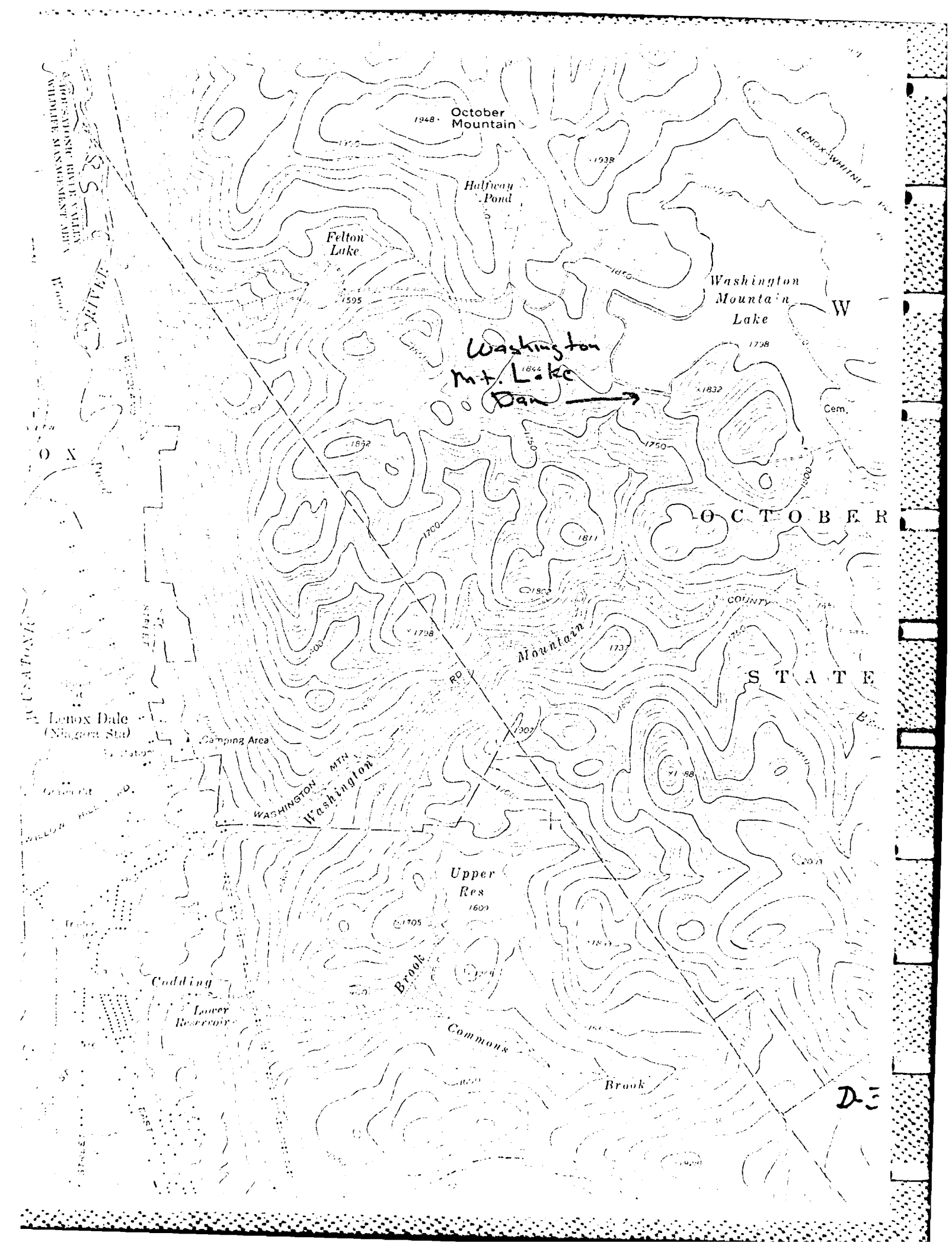
Drainage Area

Basin has rolling hills towards the lake. The lake is located in the upper portion of the basin and the hills drain into the lake by way of multiple streams

∴ Use rolling curve to determine PMF

PMF $Q = (2300 \text{ cfs/sm})(1.3 \text{ SM}) =$ 2990 CFS

say 3000 CFS


October Mountain
1948
Halfway Pond
Felton Lake
1595
Washington Mountain Lake
1798
Washington Mt. Lake Dam
1844
1832
Cem.
1750
1700
1811
1800
1798
COUNTY
Mountain
RD.
STATE
Lenox Dale
(Nilagon Sta)
Camping Area
WASHINGTON MTN
Washington
1907
1705
Upper Res
1600
Cadding Lower Reservoir
Brook
Commons
Brook
OCTOBER
D-3

Spillway and Conduit Ratings

The principal spillway has a weir length of 30.8' and is at elevation 1798.0

Six orifices are downstream of the weir in the riser structure and are 1' X 1.25'. Two on each side of the riser

High stage weirs exist at the top of the riser. Two exist and are 7.5' in length. The elevation of the weir is 1800

A 30" conduit carries the water from the riser under the dam and this conduit limits the capacity of the spillway

The dam is provided with an emergency spillway which is 50' wide and has side slopes sloping at 2 horiz. to 1 vert. The approach channel slopes to the weir at 2% and the discharge channel slopes away from the crest at 4%. The ES spillway elevation is 1801.0

The information used to establish the elevations of Washington Lk Lake Dam was obtained from Pond Plots and Design Data provided by the SCS

D-4

The system has a 30" ID conduit for the principal spillway. It is assumed that the gate will be closed for this analysis

The following spillway and conduit rating information was taken from the hydraulic section of the Design Folder for the W.M. Lake Site prepared by the SCS. The following information is only a portion of the Stage - Discharge Data found on pg 13 of the hydraulic section.

Stage - Discharge

Elevation	Q (CFS)
1799.1	3.0
.2	8.6
.3	15.3
.4	23.9
.5	33.4
.6	43.9
.7	49.4
.8	49.9
.9	50.0
1799.0	51.1
.2	52.3
.4	53.3
.6	54.5
.8	55.4
1800.0	56.4
.1	59.0
1801.0	61.5
.2	66.6
.4	75.0
.6	112.5
.8	167.1
1802.0	210.5
.5	235.1
1803.0	466.0
.5	626.9
1804.0	787.9

Moe

Reservoir Routing

Surcharge elevation to pass 3000 cfs
is 1804.5'

Surcharge height = 1804.5'
- 1793.0'
= 6.5 ft

From SCS Surface Area - Elevation curve
for Indian Creek Reservoir at
Dam site A = 203 Acres

Surface area at principal spillway
from same curve A = 224 Acres

Volume of surcharge = $\left(\frac{203 + 224}{2}\right)(6.5)$

= 1532.8 AF

DA = 135 sq mi = 932 A

Chan = $\frac{1532.8 \text{ AF}}{932 \text{ A}}$ = 1.90 ft = 22.8"

22.8" > 18" Therefore the
surcharge exceeds the runoff volume.
The principal spillway and spillway

D-7

Determine Required Storage

Use Figure 17, 11 from Section

National Engineering Handbook entitled

Section 4 - Hydrology

Base Period - 455 to 1350 322 AF

Inflow PMF - 1220 AF

Out Flow - 788 cfs

Inflow Peak - 2000 cfs

(AF)	(FT) Spillway Crest	Spillway Design	(cfs)
322	1793.0	1804.45	2940
242	1788.5	1804.40	2920
252	1790	1804.37	2700
262	1791	1804.30	2440
272	1802.1	1804.27	2100
282	1802.7	1804.20	1870
		1804.10	1520
		1804.0	

D-7A

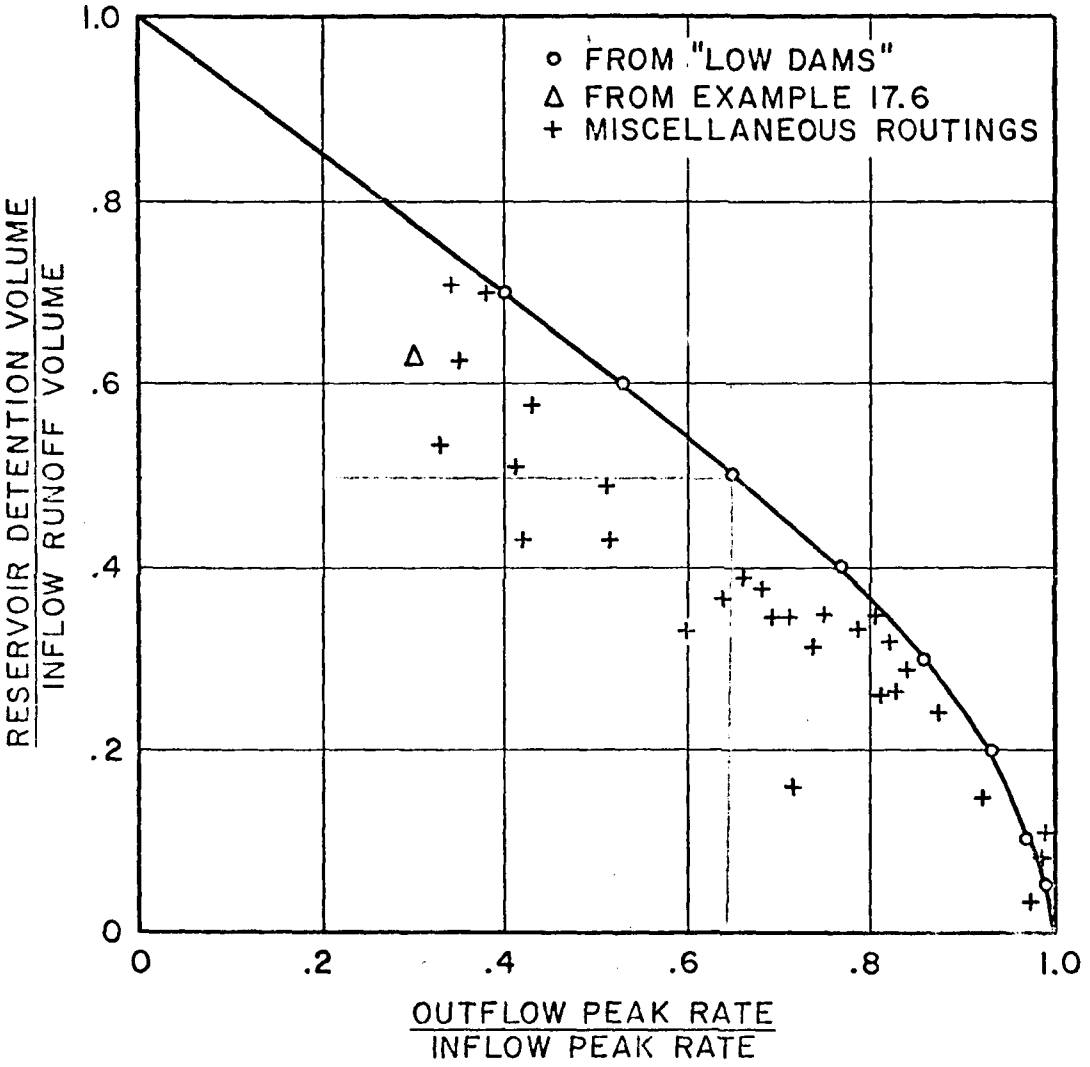
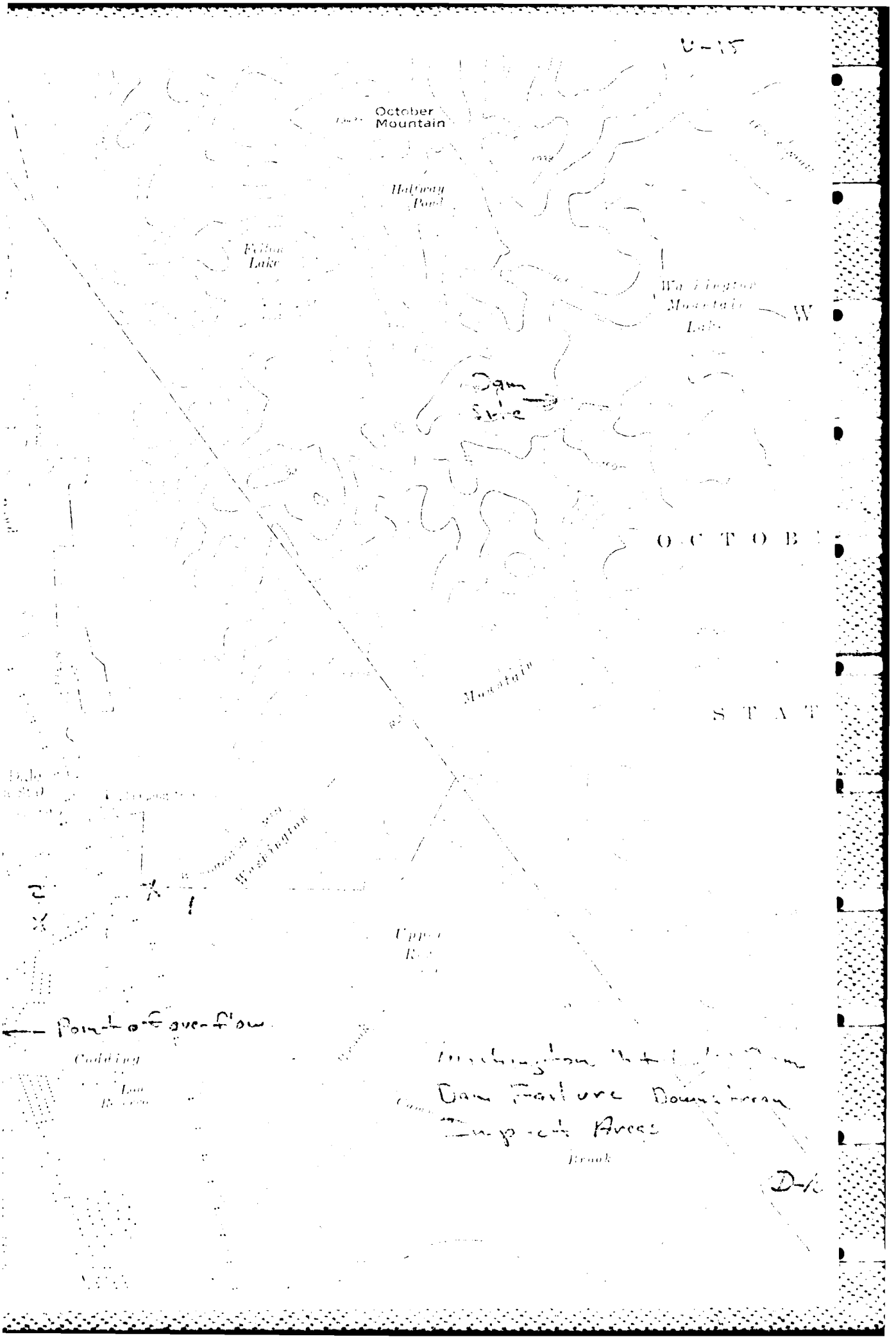


FIGURE 17.11

D-73


October Mountain
Halfway Pond
Felton Lake
Washington Mountain Lake
Dam Site
OCTOBER
STATE
Mountain
Point of Over-flow
Cobbling
Dam Failure Downstream Impact Area
D-6

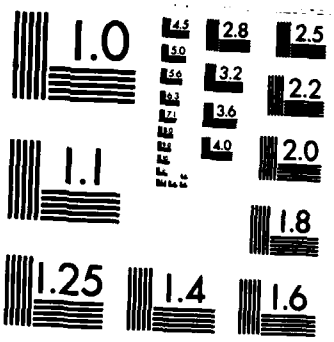
AD-A154 496 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS WASHINGTON MOUNTAIN L..(U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV DEC 79 2/2

UNCLASSIFIED F/G 13/13 NL

END

FILMED

DTIC



Moc

$Y = 13'$

$Q = (11.08)(1690)(3.49) = 65,353$ CFS

For Q_{pl}, $Y = 12.5'$

$V = (12{,}000)(12.5)(12.5) \div 43560 =$ 430 AF

$S = 4711$ AF (Dam overtopped)

$Q_{pl}(trial) = Q_p\left(1 - \frac{V_t}{S}\right)$

$= 58900\,(CFS)\left(1 - \frac{430\,AF}{4711\,AF}\right)$

$= 53{,}524$ CFS $Y = 12.3'$

$V = 416$ AF, $V_{ave} = \frac{416 + 430}{2}$

$Q_p = 58900\,(CFS)\left(1 - \frac{423}{4711}\right) =$

$= \underline{53{,}611.4}$ CFS

Condition

10.6
10.6
2.0
W.P. 45

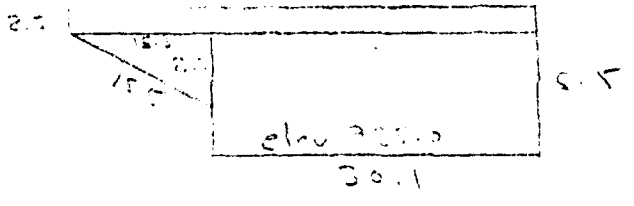
D-11

Computations Checked by Moe

Q = 6,947.2 CFS (bridge capacity)

For ... bridge alone
... not reduce ...
Capacity ... flow ...
... 13.5 ...
... ...

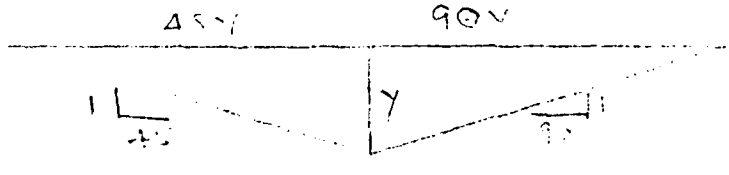
Small Downstream Crossing
Bridge on Wingfield St



5.5
30.1
5.5
2.5
15.5
59.1

n = 0.03 A = 194.7 SF
S = 0.03 WP = 59.1 FT
R = 3.12
Q = 33[illegible] CFS (bridge capacity)

Total ... Flow ... For
... Grounds ...

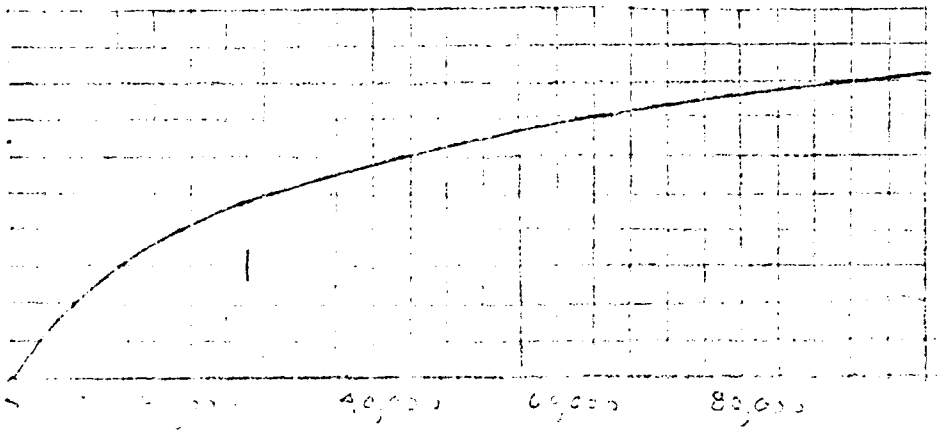


n = 0.03 A = 67.5 ...
S = 0.03 WP = ...
R = 0.5 ...

Moe

Proj Length = 2000 ft

Chan Vol = 2000 x ($\frac{1}{2}$ mid + $\frac{1}{2}$ mid)



Q (CFS)

$$Q = \frac{1.49}{n} (A)(R^{\frac{2}{3}})(S^{\frac{1}{2}})$$

Try Y = 5

$$Q = \frac{1.49}{n} (0.5 \times 25)(0.5)(0.01)^{\frac{1}{2}}$$

$$= 26.79 \text{ CFS}$$

D-13

Type of Study/Hydrology | Computed By: D Lowe

Job Description: Computations | Checked By: Moe | Sheet

Estimate Peak Outflow

For Q_{pi} = 6.5'

$$V = (2000)\left(\frac{1}{2}(90)(6.5)^2 + \frac{1}{2}(1901+950)(6.5)^2\right)$$

$$= 130 \text{ AF}$$

$$Q_{pi} = (53,611.4)\left(1 - \frac{130}{4711}\right)$$

$$= 52,132 \text{ CFS} \quad y = 6.37$$

$$V = (2000)(1759 + 900)$$

$$= 121 \text{ AF}$$

$$V_{ave} = \frac{130 + 121}{2} = 125.5$$

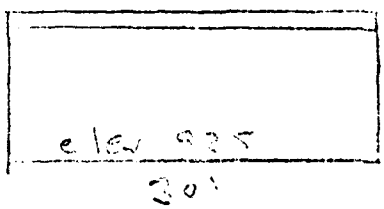
$$Q_{pi} = 53,611.4\left(1 - \frac{126}{4711}\right) =$$

$$Q_{pi} = \underline{52,178} \text{ CFS} \quad \underline{y = 6.35}$$

[illegible] the flow depth is 7.5 [illegible]

D-14

The Third Downstream Crossing
On Washington Ave Just North
Mill St



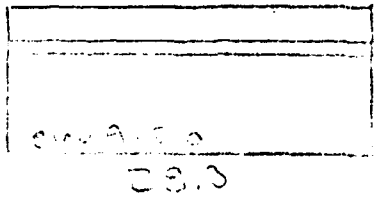
3.5
4
30
38

A = 120 SF n = 0.03
WP = 38 Ft S = 0.012
R = 3.15

$$Q = \frac{1.486}{0.03}(120)(3.15)^{2/3}(0.012)^{1/2}$$

Q = 1472 CFS

The Fourth Crossing
On Mill St



3.33
3.33
28.30
34.96

A = 93.4 SF n = 0.03
WP = 34.96 Ft S = 0.012
R = 2.67

Q = 1015.5 CFS

Checked By Moe 13 of

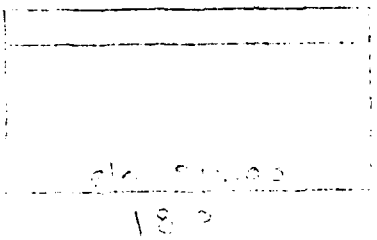
third and fourth

for the first crossing

The first crossing

R-R Bridge Between Horizontal

Plane and Full Jet



10.5
10.5
18.8
39.8

n = 0.013 A = 197.4 SF

S = 0.012 W.P. 39.8

R = 4.96

$Q = \frac{1.49}{n} (197.4)(4.96)^{2/3} (0.012)^{1/2}$

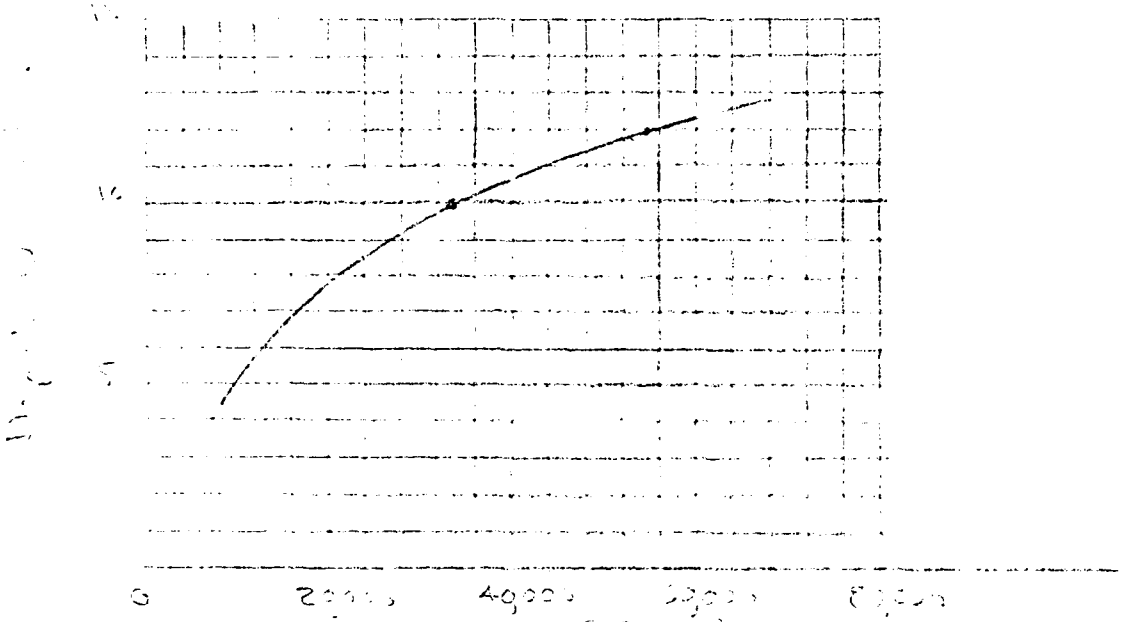
Q = 3244 CFS

Rock Above

D-16

Assume

Moe



Computation of Points On Curve

Trial Point 3

$Q = 5.65 A R^{2/3}$

Trial $y = 10$

$Q = (5.65)(2000)(4.98)^{2/3}$

$= 33,120$ CFS

Trial $y = 12'$

$Q = (5.65)(2000)(0.400 \times 12)^{2/3}$

$Q = 53,618$ CFS

Moe 15

(52,178)

Y = 11.75

L = 2000 FT

(2000 (20 11.75)) = 126 AF

(178) (1 - 126 / 4711)

= 50782.4 ... Y = 11.5 F

V = 2000 (... x 11.5) = 121 AF

(52,178) (1 - 123.5 / 4711) Vave = 123.5

69,000 CFS

Y =

13.0

926.0

D-18

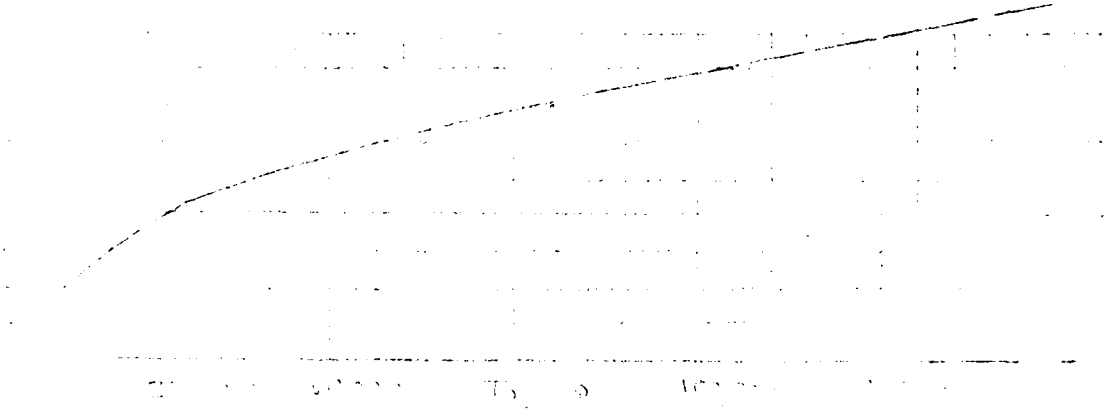
Mar 1965

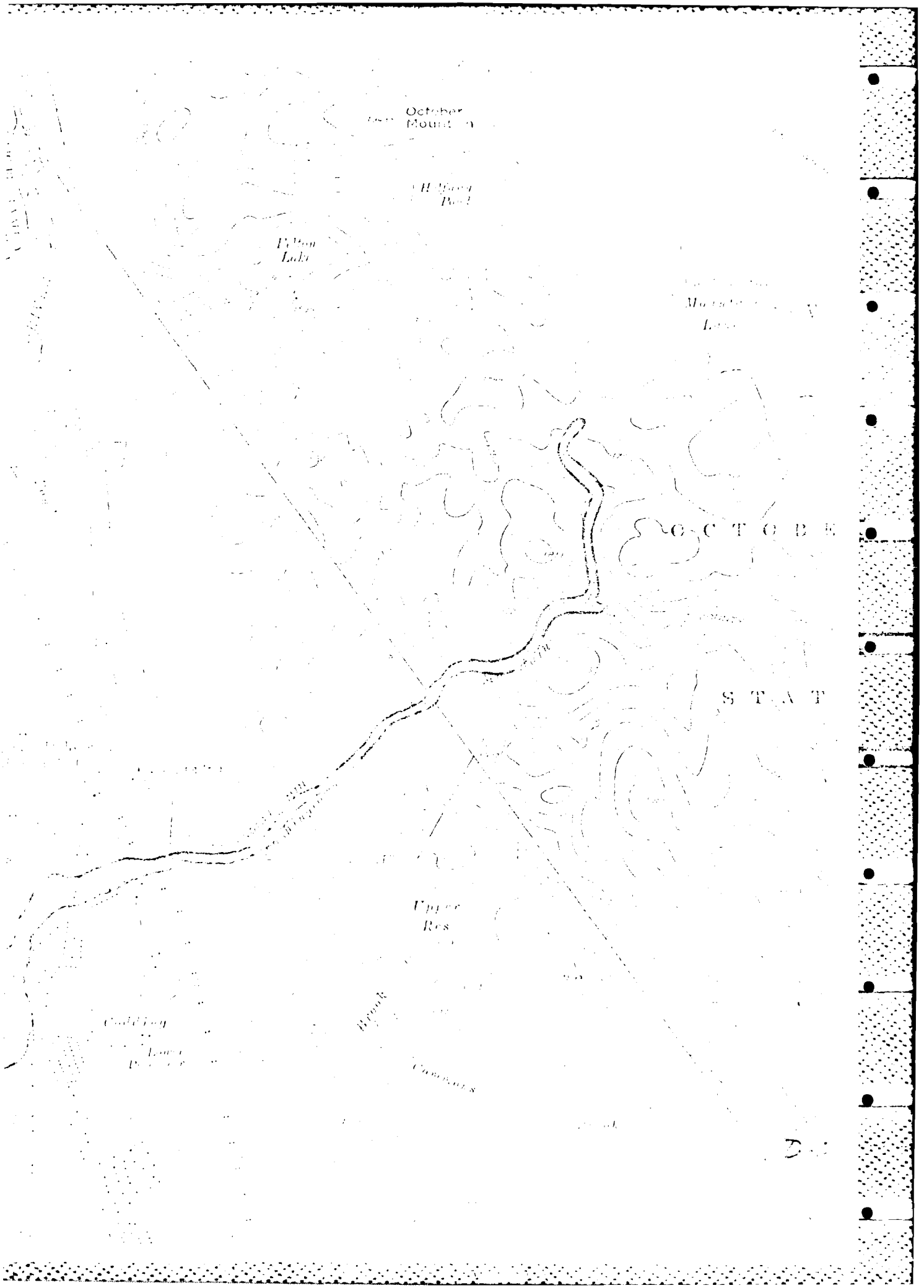
H = 87.6'

Q = 3244 CFS

Moe

7




October
Mount
Upper
Res

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

NOT AVAILABLE AT THIS TIME

END

FILMED

7-85

DTIC